

Implements of Husbandry Study

*Phase I Report to the Secretary of the
Wisconsin Department of Transportation*

January 31, 2013



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Prepared by

Wisconsin Department of Transportation

In partnership with

Wisconsin Department of Agriculture, Trade, and Consumer Protection

And with

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UW-Madison Department of Biological Systems Engineering
UW-Extension Environmental Resource Center
Wisconsin Traffic Operations and Safety Laboratory
Professional Nutrient Applicators Association of Wisconsin
Wisconsin Farm Bureau Federation
Professional Dairy Producers of Wisconsin
Wisconsin Towns Association
Wisconsin County Highway Association
Maxville Truck and Repair
Wisconsin Custom Operators
League of Wisconsin Municipalities
Wisconsin Agri-Business Association
Husky Farm Equipment (Ontario, Canada)
Association of Equipment Manufacturers (Milwaukee, Wisconsin)

Images on cover page are courtesy of Dana Cook (PNAAW) and Karen Gefvert (WI Farm Bureau).

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Executive Summary

Overview: Wisconsin agriculture is poised to meet the growing demand of the domestic and international marketplaces. For continued growth and prosperity in agriculture, a sound system of roads is needed and it all starts with farmers' ability to utilize our roads to get their implements of husbandry (IoH) (e.g. tractors, combines, self-propelled harvesting equipment, and manure tankers) between farm and fields.

Farm size and farm equipment have undergone significant changes over the past few decades. Individual farms have increased in size or have been consolidated with others, thereby increasing their size. The farm equipment industry has responded by producing larger, and heavier, IoH. The evolution of agricultural equipment is designed to meet productivity and functionality needs in the field, but often creates a mismatch between the equipment and its use on public roadways.

Innovations such as steerable axles, flotation tires, new tire designs and tracks have been implemented in recent years. These and other innovations are geared toward improved field operation, yet often are accompanied by increases in the height, length, width and weight of the agricultural equipment are creating concerns about public safety and infrastructure impacts.

Key Problem: Increases in size and weight of agricultural equipment have led to unplanned for strains on public roadways and bridges, impacts on traffic, laws that do not adequately address the types and sizes of equipment in use. This has also produced confusion and concerns for the motoring public, law enforcement, transportation authorities and the agricultural industry. Many farmers and custom operators that need to operate IoH on Wisconsin roadways already exceed Wisconsin's size and weight regulations, regardless of whether it's an independent unit, loaded or unloaded, or combination of equipment and vehicles in tow.



*This picture is courtesy of the
Wisconsin Department of
Transportation*

The main concerns for the interested parties are:

- Agricultural Industry
 - How to meet demands of the competitive agricultural industry while attempting to conform to all of the conflicting multi-agency rules and regulations while sustaining a profitable business.
- Motoring Public
 - Traffic impacts of large slow moving equipment that obstructs sightlines and is difficult to maneuver around, and costs and delays related to repairing roads impacted by heavy equipment.
- Law Enforcement
 - Fairly applying the laws intended to achieve safety and protection of roadways when it requires determining whether a converted commercial motor vehicles (CMV) is an IoH,

and being able to rely on laws that are consistent with current agricultural industry practices and are acceptable to public roadway authorities.

- Transportation Authorities
 - Potential impacts on public infrastructure that may significantly reduce the lives of bridges, culverts, and pavements, or even result in catastrophic failure of some structures.

IoH Study Group Creation: Instances of conflict with impacts to roadways, traffic, and enforcement situations drew attention to a need for action to address these long developing concerns. The Wisconsin Department of Transportation (WisDOT) responded to the input from a variety of affected parties, including those within the agricultural industry and public road authorities, to form a task force. The interested parties were invited to participate in a kick-off meeting. It was determined that the initial focus would be on IoH in support of the farming operation. Other agriculture commodity transport, such as value-added transport, will be addressed at a later time. A comprehensive list of the task force membership can be found within the IoH Study Group section of this Phase I Report.

The IoH Study Group held several meetings over a four month time span from late 2012 into early 2013. The IoH Study Group agreed that the initial charge was to be:

- Examine the current statutory definition of “IoH” and propose changes to simplify compliance and enforcement.
- Identify and propose interim solutions and recommendations to deal with the continuing business needs of the agricultural industry.
- Familiarize transportation authorities and other interests to current field operations, practices, and challenges.
- Identify and analyze a comprehensive overview of each implement and its impacts on public infrastructure that can be used in public policy discussions regarding size and weight.
- Provide recommendation for early action through a Phase I Report by January 31, 2013.
- Follow through to be addressed in the January 31, 2013 Phase I Report.

Remaining Issues for Review: The following issues will be addressed in future reports:

- Weight
- Responsible Permitting Amendments
- Highway Safety Concerns

Initial Recommendations

Initial Recommendations: The background on all of these recommendations by the IoH Study Group can be found in greater detail within this Phase I Report. This Phase I Report does not explicitly establish statutory language; rather, the creation or amendments to Wisconsin law are summarized based on suggestions by the IoH Study Group. This Phase I Report will be sent to the Secretary of the Wisconsin Department of Transportation on January 31, 2013. The IoH Study Group, by consensus, offers the following recommendations:

- Create or amend statutory definitions and categories of IoH to assist in determining whether a vehicle, piece of equipment or machinery, or trailer is designed for agricultural purposes and used exclusively in the conduct of agricultural operation.
- Establish a decal requirement for those vehicles identified as IoH that are self-propelled CMVs specifically and exclusively used in the conduct and support of an agricultural operation. The decal would be available from a transportation agency for an annual or periodic fee. The decal and fees would:
 - Create a unique identifier for law enforcement
 - Cover the cost of the administration of the decal, as well as education and out-reach
 - Provide a mechanism to potential generate funds to target toward needs related to road use by agriculture through existing road improvement programs such as Town Road Improvement Programs (TRIP) and County Highway Improvement Programs (CHIP).
- Establish provision for maximum IoH width when operated on public roadways, and a separate, more restrictive maximum width for IoH that are categorized as self-propelled IoH CMVs.
 - Create a maximum envelope allowance for IoH and combinations (not to exceed two towed vehicles) that may operate without a permit up to 100' long, 15' wide, and 16' high. This provision will not apply to IoH CMV conversions. IoH CMVs would remain subject to separate within Wisconsin statutory size limits. The new maximum width limitation for non IoH CMV would apply to equipment manufactured or retrofitted after December 31, 2014. The manufactured or retrofitted manufacture date must be permanently affixed and displayed.
 - Create a separate provision that allows IoH CMVs a maximum width allowance of 10', to allow for all attachments, additional tire width, or extensions.
 - Create authority to issue permits for operation of IoH and combination in excess of the maximum width subject to conditions established for such permits.
- Encourage the use and implementation of best practices found within this Phase I Report (including, but not limited to alternative transport, such as pipelines).
- Propose statutory changes that also provide authority for longitudinal accommodation. Create broad authority to issue permits to accommodate pipelines for liquid manure/nutrients including longitudinally in right of way when need is demonstrated, under specific conditions.
- Establish a standing forum under the direction of the WisDOT Secretary with participation of DATCP to bring together stakeholders affected by issues related to transportation and agriculture. The forum will focus on encouraging broad stakeholder participation to address transportation needs and impacts related to agriculture.

- Within 90 days, create a plan of action to outline the remaining issues of weight (loading, repetitions, and axle and wheel spacing), reasonable permitting amendments, and highway safety concerns.
- Within 30 days, establish an outreach sub-committee or work group. The outreach committee would be responsible for education and developing educational materials.

Agriculture in Wisconsin

Contributions of Wisconsin Agriculture to the State's Economy and the Need for a Sound Road System

Wisconsin agriculture is the cornerstone of our state's history, a driver in today's economy and key to our future. For decades Wisconsin has been known as America's Dairyland, but the diversity and impact of our state's agriculture industry goes much further.

Agriculture contributes \$59.16 billion annually to our state's economy. This is about 12.5% of Wisconsin's total sales. A majority of this economic impact, almost \$50 billion, comes from agricultural processing. Using an industry sales multiplier, every dollar of agricultural activity yields an additional 52 cents of industrial sales elsewhere in Wisconsin's economy.

Annually, Wisconsin agriculture contributes 353,991 jobs, about 10% of the state's employment. Agricultural jobs are very diverse. On-farm production contributes 132,000 jobs. Processing contributes 251,800 jobs. Horticulture contributes 16,700 jobs. Forestry and logging contributes 7,600 jobs. Every job in agriculture supports an additional 0.89 jobs elsewhere in Wisconsin.

In 2007, agriculture contributed \$20.2 billion to total income, about 9.0% of Wisconsin's total income. The majority of this comes from the agricultural processing sectors. The economic activity supported by agriculture also provides tax revenues used to fund public services. The total level of revenue generated is about \$2.5 billion, most in the form of property and sales taxes.

The dairy industry itself contributes \$26.5 billion to Wisconsin's economy each year. The dairy industry is a tremendous driving force in Wisconsin's economy, both rural and urban. Each one of our 1.27 million dairy cows, on more than 11,000 dairy farms, generates \$20,000 worth of additional economic impact. The companies that provide inputs into the dairy industry - feed mills, dairy equipment manufacturers and technicians, veterinarians, construction companies, genetics companies, milk haulers, dairy plants, dairy software companies - create a wave of economic impact that rolls across the entire state.

In 2011, the state produced 26.1 billion pounds of milk with approximately 90% of that milk made into cheese. Our state's nearly 1,200 licensed cheese makers produce more than 600 types, styles and varieties of cheese – nearly double the number of any other state. Wisconsin cheese makers make a quarter of the nation's cheese, ranking Wisconsin as the top cheese producing state. In 2011, Wisconsin produced more than 2.6 billion pounds of cheese. Wisconsin ranks first among all states in the production of cheddar, American, provolone, and Muenster cheeses. The state is known for its quality as well as quantity of cheese. Wisconsin leads the nation in the production of 586 million pounds of specialty cheeses, including but not limited to asiago, gorgonzola, gruyere, aged cheddar, gouda, and limburger.

Wisconsin's 77,000 farmers grow a variety of crops, from cash grains to specialty crops on about 15 million acres of land. In 2012, Wisconsin was expected to harvest 431 million bushels of corn and 66.3 million bushels of soybeans. In 2011, the Wisconsin corn crop was valued at \$3.11 billion and Wisconsin's soybean crop was valued at \$861 million. In addition, with just under 16 million tons harvested, Wisconsin leads the nation in the production of corn silage, which is fed predominately to dairy cattle.

Wisconsin is second in the nation for harvested acreage, total production and value of production of the major processing vegetables. In 2011, Wisconsin, producers were, number one in the production of snap beans, harvesting 301,240 tons. Wisconsin also produced, 92,390 tons of carrots for processing, 72,670 tons of green peas and 30,690 tons of cucumbers for pickles. Further, the state ranks third in the nation in potato production and in 2011 harvested potatoes on 62,500 acres, with a value of more than \$262 million.

Wisconsin ranks first in the nation in cranberry production and in 2011 recorded our second highest crop with 4.41 million barrels from 18,000 acres.

The effect of Wisconsin agriculture is worldwide. During the first three quarters of 2012, Wisconsin exported over \$2.2 billion of agricultural products. Wisconsin ranks 12th in the nation for the value of agricultural exports, up from 17th during the same period in 2011. The state exports agricultural products to over 145 countries. The top three agricultural markets for Wisconsin are Canada, Mexico and China. Top agricultural export products are ethanol, miscellaneous foods, and dairy-related goods. Wisconsin is known for its abundance of safe and high-quality products.

None of this would be possible without a sound system of roads and bridges for the equipment used to plant and harvest crops, apply nutrients, deliver milk or transport processed agricultural products to market.

Sources:

Deller, Steve. Agriculture & Natural Resources University of Wisconsin-Extension. The Contribution of Agriculture to the Wisconsin Economy, 31 July 2009. Web. <<http://www.uwex.edu/ces/ag/wisag/>>.

National Agricultural Statistics Service, Wisconsin. Web. <http://www.nass.usda.gov/Statistics_by_State/Wisconsin>.

Wisconsin International Trade Team, DATCP. Web. <<http://datcp.wi.gov/news/index.aspx?ID=708>>.

The IoH Study Group

Wisconsin Agricultural Initiative: In an effort to clarify statutory distinctions among agricultural equipment types, an IoH task force was created to examine and analyze current IoH. After the group's initial meeting, it was determined that a broader effort was needed and that the various agricultural transport issues needed to be broken down and addressed separately. The IoH Study Group will have more than one report to deliver and will first focus on IoH in support of farm operations. Value added transport and other agricultural commodity transport issues will be taken up by a broader group which may include those who have participated and supported the IoH Study Group's efforts to date. Further discussion and development of the broader initiative to address any issues not resolved by January 31, 2013 is needed.

IoH Study Group Creation: Due to law enforcement and maintenance authorities' response to the rapid increase in size and weight, the Wisconsin Department of Transportation (WisDOT) agreed to fulfill the long standing request by the agricultural industry to form a task force. The interested parties were invited to participate in a kick-off meeting in October 2012. It was determined that the initial focus would be on IoH in support of the farming operation. Other agriculture commodity transport, such as value-added transport, will be addressed at a later time. The IoH Study Group is comprised of:

- Wisconsin Department of Transportation
- Wisconsin Department of Agriculture, Trade, and Consumer Protection
- UW Center for Agricultural Safety and Health
- UW-Madison Department of Biological Systems Engineering
- UW-Extension Environmental Resource Center
- Wisconsin Traffic Operations and Safety Laboratory
- Private Industry:
 - Professional Nutrient Applicators Association of Wisconsin
 - Wisconsin Farm Bureau Federation
 - Professional Dairy Producers of Wisconsin
 - Wisconsin Towns Association
 - Wisconsin County Highway Association
 - Maxville Truck and Repair
 - Wisconsin Custom Operators
 - League of Wisconsin Municipalities
 - Wisconsin Agri-Business Association
 - Husky Farm Equipment (Ontario, Canada)
 - Association of Equipment Manufacturers (Milwaukee, Wisconsin)

IoH Study Group Goals and Objectives: The first goal of the IoH Study Group was to examine the current statutory definitions of IoH in Wisconsin law and determine if there are any policy conflicts. The objective was to classify IoH into categories including CMV converts. The next goal was to develop equipment profiles of IoH that are potentially causing size and weight concerns on roadways, bridges, and culverts. The objective of reviewing size and weight regulations of IoH is to produce an overview of implement-by-implement impacts to be used in potential public policy discussions regarding size and weight. Lastly, identify and propose interim solutions and recommendations to deal with the continuing business needs of the agricultural industry while the aforementioned goals and objectives are vetted by the IoH Study Group.

Role of IoH Work Groups: In an effort to assist the IoH Study Group in achieving its goals and objectives, IoH Work Groups were created to provide initial recommendations. The IoH Work Groups were comprised of IoH Study Group members. The two IoH Work Groups that were established are the IoH Policy Work Group and the Equipment Profiles Work Group.

IoH Study Time Frame: During the first four months of the study, the IoH Study Group focused on:

- Gaining a better understanding of the needs of agriculture, more specifically related to operation of IoH on or across public roads;
- Providing information about the physical and operational constraints related to the public road network;
- Soliciting and reviewing best practices related to operation alternatives or interim solutions, while engineering analysis of weight is conducted;
- Looking for opportunities to better meet the needs of agriculture in the near term through potential legislation or policy adjustments.

The IoH Study Group held meetings on:

- October 24, 2012
- November 7, 2012
- December 5, 2012
- December 17, 2012
- January 10, 2013
- January 24, 2013

The IoH Work Groups held meetings on:

- October 29, 2012
- November 2, 2012
- December 4, 2012
- December 11, 2012
- December 13, 2012
- December 20, 2012
- January 3, 2013
- January 8, 2013
- January 17, 2013
- January 22, 2013

The IoH Study Group committed to producing this Phase I Report providing recommendations to the WisDOT Secretary. This Phase I Report also highlights efforts that will require additional time and review and proposes to permanently establish an agricultural initiative that will be charged with addressing broader agricultural transport issues in support of farming operations in Wisconsin.

IoH Website: During an IoH Study Group meeting, it was suggested that an IoH agricultural initiative website be created. This website contains all meeting agendas, minutes and presentations.

The IoH website can be found by visiting: <http://www.topslab.wisc.edu/workgroups/waiioh.html>.

Role of Engineering

Overview: Engineering plays an integral role in regulating envelope size and weight of motor vehicles and equipment designed to operate on public infrastructure. With the implementation of larger and heavier specialized farm equipment coupled with the increased range of use (multiple farms and fields) and need to use roads and bridges, and to cross culverts, size and weight of this equipment has become the key issue.

Another challenge for the agriculture industry when moving larger and heavier equipment is that Wisconsin's county and local road systems are predominately paved unlike the immediate neighboring states. In addition, the diverse nature and condition of bridges on roadways and the potential impact to the conditions of these bridges by loading of agricultural vehicles is difficult to assess.

The IoH Study Group was formed in large part to address the size and weight issues and other concerns presented by the agricultural industry. However, more than four months is needed to properly and effectively analyze the equipment, especially if the practice of converting implements to CMVs (for engineering reviews and law enforcement) is set aside and a new formula is developed and adopted to assess and analyze the implements as designed.



This picture is courtesy of Cheryl Skjolaas.

Roadway, pavement, structure, and implement engineers must supply one another with the necessary information in order to start the process of analyzing infrastructure impacts from these implements. The study group should know it will take significant time and other resources to complete this task. Included here are links to two research projects related to load distribution aspects of IoH:

- In April 2012, the Minnesota Department of Transportation issued a 551-page report on the “Effects of Implements of Husbandry (Farm Equipment) on Pavement Performance.”
 - The report can be found here:
<http://www.topslab.wisc.edu/workgroups/ioh/resources/201208.pdf>.
- Iowa State University is currently conducting a study on “The Effects of Implements of Husbandry Farm Equipment on Rigid Pavement Performance.”
 - This research is scheduled to provide insights by 2015.
 - The results of the study have not been publicized, but an initial report on the Iowa State University study can be found here:
<http://www.topslab.wisc.edu/workgroups/ioh/resources/viewcontent.pdf>.

Size: IoH have increased in length, width and height over the past 50 years and currently there are no envelope size limitations in Wisconsin law for individual IoH. Some CMVs have been modified or retrofitted for agricultural use. For example, a standard CMV might be retrofitted in such a way to include a manure tank or large box for see (refer to Figure 1). There are envelope restrictions on these vehicles.



Image courtesy of Dana Cook (PNAAW)

Figure 1

Confusion exists between law enforcement and the agricultural industry as to whether the vehicle pictured is an IoH or a CMV. Many vehicles, used as IoH, that are equipped with control arms, specialty tires (floatation tires), and other such features often violate current width laws and regulations in Wisconsin.

Bridges, signs, light poles, and utility wires, just to name a few, are obstacles for IoH vehicles and equipment. Due to the sheer size of some IoH, it is difficult for IoH operators to navigate around these obstacles. In some cases, the obstacles could become damaged and could cause safety concerns for the general motoring public.

Weight: Engineers design roads to accommodate projected vehicle loads; in particular, heavy vehicle axle loads. The life of a pavement is related to the magnitude, number of repetitions and spacing of heavy axle loads. There are instances where IoH can exceed Wisconsin weight laws. This may be true for many existing IoH operating on Wisconsin roads. Figure 2 is an example of one such IoH:



Image courtesy of Dana Cook (PNAAW)

Figure 2

The effect of large and heavy equipment on pavements is not constant throughout the year. During the winter, when the ground is frozen, a truck carrying a given load causes less damage to pavements than at other times of the year. During the spring, the inverse is true: pavement structure layers are generally in a saturated, weakened state due to partial thaw conditions and trapped water, causing greater pavement damage by the same truck.

An area of concern related to structures is the number of bridges on secondary roads. These local bridges include ones that are load restricted (posted) as a result of condition and obsolescence. Local road structures that are under the jurisdiction of county and local maintenance authorities may not be subject to the level of maintenance and upgrade as structures on primary roads under the jurisdiction of WisDOT. The impact of IoH on these structures and the ability of county and local maintenance authorities to monitor and respond to higher levels of deterioration as a result of greater loading is a significant concern.

Heavy IoH are not designed to meet local road and bridge size and weight requirements. However, large and heavy IoH are currently operating on these pavements and structures. Some equipment manufacturers have stated that some of the IoH and agricultural equipment are being designed and manufactured for optimal field performance with no existing requirement to conform to the size and weight laws in Wisconsin and perhaps other states.

Wisconsin has the luxury of having many paved roads and reliable bridges. Wisconsin has a known inventory of more than 14,000 bridges and over 115,000 miles of state and local roadways that are maintained by the respective jurisdictional agencies. By Federal Highway Administration (FHWA) definition, a bridge has a minimum clear span length of 20 feet between the faces of abutments. The average width of paved roadways is 20' from edge of pavement to edge of pavement.

Another challenge to continued operations on local roadways and bridges is the large number of culverts under roadways. A culvert can resemble a bridge with similar features and characteristics, but is less than 20 feet long from abutment to abutment. Culverts can also be fixed metal or precast/concrete pipes or chutes. Culverts, unlike bridges, are not inventoried or even inspected in the same manner as state, county, and local bridges.

A definitive quantitative analysis that addresses the impacts of IoH or that makes a correlation of IoH to current permit options for a variety of vehicles may take a significant amount of resource and time. In addition, once a representative IoH vehicle and related distribution factor of the loading is determined, there would be the need to analyze specific routes and unique bridges on these routes to determine if the impacts of the IoH on the structures would be detrimental.

Although IoH have become larger and heavier in recent years, law enforcement recognizes these pieces of equipment must still operate by abiding by Wisconsin weight guidelines established in statute. Many IoH and CMVs designed for agricultural use are not consistent with Wisconsin law; thus, an IoH Study Group was formed to assist in addressing weight related issues concerning certain agricultural equipment types. It is important to note that studying the magnitude, repetitions and spacing of axle weights of vehicles and the effects on pavements and structures can take considerable time. This analysis cannot be addressed within the current time frame of the IoH Study Group's initial recommendation deadline.

Highway Safety Considerations: Highway safety has been a consideration of the IoH Study Group and will be covered in a future report.

Review of Wisconsin Statutes

IoH Categories

Overview: Current definitions in Wisconsin statute (Chapters 340, 341, and 348) do not provide for clear distinction among agricultural equipment types. This results in unclear guidance to road users and enforcement regarding size, weight, operating and safety equipment requirements and restrictions and operator qualifications. Current definitions in Wisconsin Statutes of farm tractors and IoH are referred to by statutes regarding size, weight, operation requirements, equipment requirements and operator qualifications and requirements. Current terms need to better reflect the desired distinctions between IoH CMVs and non-CMV agricultural equipment.

Current Structure of Wisconsin statutes: Chapter 340 lists definitions of vehicles that apply to Chapters 341-349, with the following exception: where a separate definition is provided in a chapter within the 341-349 range, then it overrides the definition found in Chapter 340. Specifically, the definition of IoH in Chapter 341 regarding vehicle registration (“license plates”) overrides the definition found in Chapter 340.

For quick reference, here are the chapter topics which relate to the IoH Study Group: Chapter 341 (description of vehicle registration – license plates), Chapter 342 (vehicle titling), Chapter 343 (driver licensing), and Chapter 348 (vehicle size and weight allowances and limitations).

Reviewed Proposals: In order to provide clarity and guidance to road users and law enforcement regarding size, weight, operating and safety equipment requirements and restrictions and other operator qualifications for IoH, the IoH Study Group has identified the following possible solutions:

1. **Category I: Amend farm tractor definition.** The farm tractor definition has been considered to be out-of-date. As a result, the farm tractor definition in Wisconsin Statutes is expanded to provide more detail in the definition for clarity purposes and includes “IoH” in the title.
2. **Category II: Create IoH self-propelled definition.** Currently, the term “self-propelled IoH” are not clearly identified in Wisconsin Statute. Thus if found necessary, establishing a definition for self-propelled IoH could possibly lead to size limitations for this vehicle.
3. **Category III: Create IoH CMV definition.** CMV converted IoH have become relatively commonplace in the state of Wisconsin. Thus, IoH CMVs are widely used and operated in the state of Wisconsin. Currently, IoH CMVs are regulated by following standard CMV laws and regulations, but this change would separate IoH CMVs from other CMV definitions in Wisconsin Statute. If found necessary, this change would allow IoH CMVs to have specific regulations.
4. **Category IV: Create definitions for IoH trains, towed equipment, and trailers.** This category should outline what can and cannot be within a vehicle train, towed, or trailered by the vehicles described in the first three categories.

- a. **Create loH train definition.** Although references to loH trains can be found within Wisconsin Statutes, the terminology is vague. To clarify the vagueness in Wisconsin Statute, an loH Train definition is recommended. Additionally if deemed necessary, establishing a definition of an loH Train could possibly lead to size limitations for this vehicle combination.
 - b. **Create an loH CMV trailer definition.** Although a “farm trailer” has been defined in Wisconsin Statute, an loH CMV trailer has not. Currently, towed CMV trailers have no size limitations. Furthermore if warranted, creating this definition could possibly create size limitations for this vehicle.
 - c. **Create an loH towed equipment definition.** Although a “farm trailer” has been defined in Wisconsin Statute, an loH - towed equipment has not. Currently, loH - towed equipment have no size limitations. Furthermore if warranted, creating this definition could possibly create size limitations for this vehicle..
 - d. **Create loH CMV conversion train definition.** Due to the vagueness of loH Trains in Wisconsin Statute as previously mentioned in alternative no. 6 and due to the increased usage of loH CMVs, an loH self-propelled train definition is recommended. Due to the possible adoption of alternative no. 5 to Wisconsin Statute, this addition to Wisconsin Statute would allow loH CMVs to have specific regulations if found necessary as well.
5. **Review the loH definition found in 341.01 (2) (a).** The stand-alone definition of loH found within Chapter 341.01 should be reviewed if Alternative Definitions 2 through 7 are amended or created as definitions. Additionally, the wording “a trailer– mounted bulk liquid fertilizer container” should be removed from Chapter 341.01 (2) (a) and inserted into Chapter 340.01 (17k) (c) if the loH Study Group recommends Chapter 341.01 (2) (a) be stricken. In an effort to remove any ambiguity in loH definitions found within Wisconsin Statutes, any conflicting definitions should be examined to determine if the loH definition currently found within Chapter 341.01 (2) (a) maintains the structural definition of the loH definitions created in alternatives 2 through 7.
 6. **Include loH trains and loH CMV trains in 348.08.** If alternatives 6 and 7 are adopted, it shall then be recommended that loH trains and loH CMV Conversion trains should be updated in Chapter 348.08.

Conclusions: Establishing clear definitions of loH will assist in determining whether a vehicle, piece of equipment or machinery, or trailer is designed for agricultural purposes and used exclusively in the conduct of agricultural operations.

Plates or Stickers

Overview: IoH CMVs operate on the public roads and are subject to enforcement of driving and vehicle equipment law, but no registration (license plate) fee is charged, nor do the vehicles display a license plate or other visible identifier. Wisconsin Statutes currently exempt a CMV IoH conversion from registration and from display of license plates.

Some IoH operators have indicated a preference for some form of documentation that could be used in the field to clarify their understanding of the requirements related to an IoH that is a CMV or CMV conversion and the related privileges and restrictions that apply to the operation of an IoH.

Reviewed Proposals: An improved definition identifying the IoH-CMV, and the requiring of vehicle registration and license plates would assist in identification of this category of CMVs used exclusively for agricultural purposes. Identification would promote uniform compliance and enforcement. As a result, the IoH Study Group has identified the following possible solutions:

1. **Require a 12 year non-transferable IoH plate for \$250/100/50.** Covers cost of plate with revenue left over. The proposed fee would be reflective of seasonal use. Having an IOH plate that has a good definition of uses, weights and operating parameters would greatly enhance the intended use, safety and law enforcement's ability to have a law to enforce.

This would require an improved definition of the CMV-IoH in order to provide more clear guidance to vehicle owners and to law enforcement. The current definition includes a hard-to-quantify reference to "principally off-road". Design and origin/destination elements would provide more clear guidance pertinent to the distinction between CMV-IoH and farm truck.

2. **Require a decal.** A decal could be created in bright color and larger and thus be more distinctive, and perhaps distributed at lower cost.
3. **Require a farm truck plate, same as for other farm trucks.** Covers cost of plate with revenue left over. The fee schedule proposed would not be consistent with use, due to the fact that the vast majority of the CMV-IoH's are seasonal/limited use (less than 16 weeks of the year), depending upon the specific use of the CMV-IoH. Would also be too distracting to law enforcement due to the wide area that a farm plate covers, and would also leave CMV-IoH's open to interpretation from law enforcement.
4. **Require a standard truck plate at full fees, and allow for-hire operation.** Same as item 3. Covers cost of plate with revenue left over. The fee schedule proposed would not be consistent with seasonal use, due to the fact that the vast majority of the IOH's are seasonal/limited use (less than 16 weeks of the year) depending upon the specific use of the IOH. Would also be too distracting to law enforcement due to the wide area that a farm plate covers, and would also leave IOH's open to interpretation from law enforcement. And there is virtually no way to differentiate between the farm use and for-hire.
5. **Require plates or decal only for custom or for-hire work.** While an imperfect indicator, the absence of the plate or decal would imply that operation is own-farm only. The presence of the plate or decal would indicate that although operation may be own-farm, it may also be

customer or for-hire under which circumstances driver and hours of service requirements would apply.

Conclusions: An improved definition identifying the loH-CMV, and the requiring of vehicle registration and/or vehicle sticker would assist in identification of this category of CMVs used exclusively for agricultural purposes. Identification would promote uniform compliance and enforcement.

The Wisconsin Department of Revenue suggests that if a plate was recommended an loH-CMV vehicle could no longer operate using dyed fuel because of laws established by Wisconsin and the Internal Revenue Service (IRS). However, a vehicle sticker could assist in confirming loH-CMVs can operate using dyed fuels.

Funding received from the implementation of loH stickers will be distributed accordingly and a portion of the revenue received by the loH stickers will be distributed to local transportation efforts. Given the relatively small number of loH CMVs, the potential to cover the administrative costs of a sticker program may be problematic, and would likely not have strong potential to generate additional revenue that could be targeted to needs related to these uses of public roadways.

Exemptions for Commercial versus Farm Operations

Overview: Some farm owners/operators perform farm operations for other farms, with commercial-motor-vehicle implements-of-husbandry (CMV IoH), and with standard CMVs. Some farm owners/operators don't comply with equipment safety requirements that apply to all CMV's. This increases highway safety risks; and by reducing costs, allows them to unfairly undercut the prices of custom farm business operators that do meet existing CDL, vehicle safety, and vehicle safety program requirements.

IoH Study Group Considerations: Farm owners/operators can haul their own products without CDL's up to certain distances. They are required to have a USDOT number for trucks over 10,000 pounds, and are required to meet other vehicle safety equipment requirements for these vehicles.

1. **No change/do nothing alternative.** Not an option at this point. It is why we have the issue today. Current laws or lack thereof leaves too much open for interpretation when dealing with law enforcement.
2. **Increase education of farm owners/operators.** Increase education specifically with respect to CDL requirements, and to equipment requirements; and if MAP-21 exemptions do not apply to operations with respect to farms not owned/operated by the vehicle owner, then also increase education on the full range of non-exempt requirements.
3. **WisDOT will create a farm vehicle handbook.** This would describe equipment and operating requirements, size and weight limits, and driver qualification requirements, and would be available on the web.
4. **Increase enforcement.** This could be done immediately, or following a multi-month period of education.
5. **Ensure an even playing field, and safety implications.** Custom farm operators using IoH CMVs (IoH-CMV's) must currently meet standard CMV safety requirements which have a cost, while farm operators performing the same work with the same vehicles have exemptions for CDL, hours of operation, drug and alcohol testing and CMV safety program requirements. With the weight and speed of these vehicles, research could identify if the exemptions are associated with higher crash rates for exempt operations.

Conclusion: Increasing education efforts through farm magazines and other avenues could help farm owners/operators with CDL requirements, equipment requirements, and application of any MAP-21 exemptions where applicable. Thus, a coordinated effort of education and enforcement could assist in the improvement of highway safety. However, the IoH Study Group suggests that this issue should be best solved under the previous section of plates or stickers.

Best Practices

Overview: Issue papers were drafted by the IoH Policy Work Group and shared with the IoH Study Group, but the issue papers were crafted mainly for educational purposes. The goal was to highlight possible educational issues where WisDOT, counties, and towns could collaborate with other stakeholders to advocate for improved agricultural vehicle movements and alternative transport on Wisconsin roadways and structures.

Proactive Steps: The goal of WisDOT and external stakeholders is to extend the life of roadways while sustaining a profitable agricultural system and minimizing inconvenience to road users. Some potential best practices and proactive solutions identified by the IoH Study Group include:

- Moving traffic away from shoulders (i.e. one way traffic)
- Drainage Improvements
- Loading/Unloading on Side of Road
- Centerline Movements
- Pre-determined Routing
- Accommodation of Pipelines

One Way Traffic: Applicators and farmers could work with towns and counties to make roads one-way for manure hauling or other seasonal agricultural needs. The farmer and local government authorities could meet to discuss routes for hauling, considering traffic, road condition, topography, and safety. As a result, farmers and local governments can work to mutually agree or compromise on best route for loaded and empty traffic. The goal would be to designate certain roads as one way except for emergency traffic or for limited time periods, such as 2-3 days. All traffic must abide by agreed upon one-way routes and any unladen equipment must follow one-way traffic routes.

For one way traffic to work effectively, education and outreach is essential. Farmers and local governments must notify neighbors, local residents, and road users in advance of the change of road traffic to one way routes. The local government must notify 911 and other local responders in order to be effective. Additionally, education will be needed to educate citizens of role and use of one-way traffic. Lastly, law enforcement can work with local governments to assist in notifying citizens of signs and one-way routes.

Drainage Improvements: In some instances, road issues in rural areas are due to wet subgrade and sometimes cause traffic problems. One possible solution is reinforced ditches and installed perforated drainage tile to be placed in ditch bottom to lower water table.

Other possible solutions to drainage issues are to engineer water control systems. Other solutions would include curb and gutters in limited circumstances. This would allow for rapid water removal and relocation and would help keep subgrade dry. Additionally, curb and gutters can prevent heavy equipment from driving on edge of pavement in areas that are susceptible to damage from wet conditions.

Loading/Unloading on Side of Road: One possible solution to prevent loading/unloading farm equipment on the side of the road is to have a shared driveway.

Farmers could review all of the fields in advance to determine if there are any problem access points. Otherwise, farmers could work with local governments to extend culverts to allow for safer turning and road access for long equipment.

Centerline Movements: Larger and wider agriculture equipment made to be efficiently used in the field, in turn makes several types of equipment wider than highway lanes. Although State Statute 348.05 (2) & (3) provides specifics of operation of these pieces of equipment upon the highway, there is no ruling that legally allows over-width equipment to operate left of center on any state highway. Best practices are needed for safe and efficient over-width agriculture equipment movements.

The IoH Study Group has identified the following possible solutions regarding centerline movements:

- Set specific width threshold for traveling highways.
- Require all oversize IoH equipment to be hauled on CMV units and trailers.
- Allow current standards, but require a warning vehicle to travel in front and/or behind during highway travel depending on overall width.

Pre-Trip Check: A pre-trip check has also been considered as pre-determined routing. A pre-trip check suggests farming operations and custom operators examine IoH vehicle routes on roadways, bridges, culverts, and structures. This is to ensure the safety of others (i.e. agricultural industry and motoring public). This is done to make sure each IoH is capable of operating on roadways, bridges, culverts, and structures while also sharing these same roadways with other agricultural vehicles and the motoring public. A pre-trip check or pre-determined routing is a best practice that can provide safe and efficient agriculture equipment movements while reducing pavement fatigue and minimizing the impact to other road users.



This picture is courtesy of Karen Gefvert (WI Farm Bureau).

Accommodation of Pipelines: Liquid manure transport typically involves very heavy vehicles in configurations that put excessive stress on highway infrastructure, often when roadways are unable to reasonably handle these loads. Seeking to overcome obstacles so that pipeline transport is viable could avoid infrastructure damage and highway operational issues while allowing large application equipment to operate as designed and avoiding impacts of seasonal road weight limits. The goal of this best practice is to improve efficiency of transport while preserving highway infrastructure by using pipelines when feasible.

Wisconsin farmers are increasingly dealing with liquid manure that needs to be transported from collection and storage tanks or lagoons to fields where it is applied. Transport is time sensitive and often is impacted by weight limitations due to thaw conditions. Pipelines are a means of transporting liquids that can avoid road use, but are sometimes not workable due to limitations on accommodation of the lines to cross public rights of way. The IoH Study Group has identified the following possible solutions regarding accommodation of pipelines to support transport of liquid manure:

- Promote consideration of crossings by sharing information about WisDOT permit practices.
- Propose statutory changes to clarify and highlight permit potentials for these crossings.
- Propose statutory changes that also provide authority for longitudinal accommodation.

Although the IoH Study Group has identified the above possible solutions, the IoH Study Group recommends:

- Proposing statutory changes that also provide authority for longitudinal accommodation. Create broad authority to issue permits to accommodate pipelines for liquid manure/nutrients including longitudinally in right of way when need is demonstrated, under specific conditions.

Identify Problem Areas & Solutions: Farmers and local governments can partner to solve identified problems areas. Some possible solutions to common and identified problems are to:

- Invest in high quality subgrade where stress is often the greatest due to acceleration/deceleration of vehicles or turning of vehicles in intersections and driveways.
- Pave shoulders at turning points to avoid pavement erosion.
- Invest in longer culverts at field and farm driveways with paved shoulders.
- Invest in curb and gutters to protect pavement edges and allow for proper water drainage.
- Utilize town or county TIF districts (tax incremental finance districts) which could lead to infrastructure improvements mainly due to an increased tax base.
- Implement one-way traffic strategies to increase the number of hours needed to haul feed, manure, or other agricultural means during seasonal agricultural operations.
- Use piping or hoses to transfer agricultural material near right of way or culverts of roadways.

Education and Outreach Considerations: Education and outreach has been a consideration of the IoH Study Group and will be covered in a future report.



This picture is courtesy of Karen Gefvert (WI Farm Bureau).

Appendix A: Glossary

Current Wisconsin Statute Definitions:

340.01(7m) "Commercial driver license (CDL)" means a license issued to a person by this state or another jurisdiction that is in accordance with the requirements of 49 USC 31301 to 31317, or by Canada or Mexico, and that authorizes the licensee to operate certain commercial motor vehicles.

49 USC 31301(3) "commercial driver's license" means a license issued by a State to an individual authorizing the individual to operate a class of commercial motor vehicles.

340.01(8) "Commercial motor vehicle (CMV)" means a motor vehicle designed or used to transport passengers or property and having one or more of the following characteristics:

- (a) The vehicle is a single vehicle with a gross vehicle weight rating of 26,001 or more pounds or the vehicle's registered weight or actual gross weight is more than 26,000 pounds.
- (b) The vehicle is a combination vehicle with a gross combination weight rating, registered weight or actual gross weight of 26,001 or more pounds inclusive of a towed unit with a gross vehicle weight rating, registered weight or actual gross weight of more than 10,000 pounds.
- (c) The vehicle is designed to transport or is actually transporting the driver and 15 or more passengers. If the vehicle is equipped with bench type seats intended to seat more than one person, the passenger carrying capacity shall be determined under s. 340.01 (31) or, if the vehicle is a school bus, by dividing the total seating space measured in inches by 13.

340.01(24)(a) - "Implement of husbandry (IoH)" means a vehicle or piece of equipment or machinery designed for agricultural purposes, used exclusively in the conduct of agricultural operations and used principally off the highway, or a trailer-mounted bulk liquid fertilizer container.

340.01(24)(b) - "Implement of husbandry (IoH)" does not include any motor truck, farm truck, road tractor, truck tractor, or farm truck tractor or such a vehicle combined with a semitrailer, trailer or farm trailer, when the vehicle or combination is a commercial motor vehicle operated on a highway.

341.01(2)(a) - "Implement of husbandry (IoH)" means a vehicle or piece of equipment or machinery designed for agricultural purposes, used exclusively in the conduct of agricultural operations and used principally off the highway, or a trailer-mounted bulk liquid fertilizer container.

Appendix B1: IoH Categories Issue Paper

DRAFT: ISSUE PAPER

DEFINITIONS IN WISCONSIN LAW OF AGRICULTURAL EQUIPMENT OPERATING ON ROADS

Issue: How could agricultural equipment operating on roads be defined in Wisconsin law?

Goal: To have definitions of agricultural equipment that provides a clear and simple organizing structure for highway law enforcement, road users, and regulations that provide allowances and limitations.

Problem statement: Current definitions in Wisconsin Statute (Chapters 340, 341, and 348) do not provide for clear distinction among agricultural equipment types. This results in unclear guidance to road users and enforcement regarding size, weight, operating and safety equipment requirements and restrictions and operator qualifications.

Background/history: Current definitions in Wisconsin Statutes of farm tractor and implement of husbandry are referred to by statutes regarding size, weight, operation requirements, equipment requirements and operator qualifications and requirements. Current terms need to better reflect the desired distinctions between implement of husbandry – self-propelled commercial motor vehicles (IoH-CMV), and non-CMV agricultural equipment.

Here is some information on how definitions are structured in Wisconsin Statutes. Chapter 340 lists definitions of vehicles that apply to Chapters 341-349, with the following exception: where a separate definition is provided in a chapter within the 341-349 range, then it overrides the definition found in Chapter 340. Specifically, the definition of implement of husbandry in Chapter 341 regarding vehicle registration (“license plates”) overrides the definition found in Chapter 340.

For quick reference, here are the chapter topics which relate to the Implements of Husbandry Study Group: Chapter 341 (description of vehicle registration – license plates), Chapter 342 (vehicle titling), Chapter 343 (driver licensing), and Chapter 348 (vehicle size and weight allowances and limitations).

Alternatives:

1. **No change/do nothing alternative.** Current definition(s) of implements of husbandry will remain as written in Wisconsin Statute.
2. **Amend farm tractor definition.** This alternative inserts implements of husbandry into the title of a farm tractor and provides more detail. As a result, Chapter 340.01 (16) should read:

340.01 (16) “Implement of husbandry - farm tractor”;

(a) Means a ~~motor self-propelled~~ vehicle designed and used primarily as a farm implement for pulling tillage, planting, harvesting equipment drawing plows, mowing machines and other implements of husbandry for off-road agricultural purposes, used exclusively in the conduct of agricultural operations off-road, to or from field or farm, or between field and farm, and unladen operation to and from sites of vehicle manufacture, distribution, sale, repair, storage, food, fuel and rest.

(b) Means a multi-purpose farm tractor designed and used to tow farm equipment, with or without fully-mounted or semi-mounted equipment attached.

(c) Does not include IoH – self-propelled commercial motor vehicles.

3. **Create a CMV IoH trailer definition.** This alternative creates an IoH CMV trailer definition which would allow size, weight, use, driver qualifications, safety equipment, and other limitations to be applied to this category of vehicles. As a result, Chapter 340.01 (17j) should read:

340.01 (17j) “Implement of husbandry – commercial motor vehicle (CMV) trailer”:

(a) Means a trailer or semitrailer ~~with a gross weight greater than 3,000 pounds, has no motive of power, can only be drawn by another vehicle,~~ which is owned or leased and operated by a farmer and is used exclusively for the transportation of farm products or equipment from the owner’s farm to market or for the transportation of supplies to the owner’s farm. As used in this subsection “leased” means that the farmer has entered into a written agreement with a person in the business of leasing vehicles to lease the trailer or semitrailer for a period of one year or more.

(b) Means a trailer or semitrailer designed to be pulled by an Implement of Husbandry – Self-Propelled Commercial Motor Vehicle (CMV).

4. **Create an IoH towed equipment definition.** This alternative creates an IoH towed equipment definition which would allow size, weight, use, driver qualifications, safety equipment, and other limitations to be applied to this category of vehicles. Sub-letter (c) should only be added if the IoH definition found within 341.01 (2) (a) is stricken. As a result, Chapter 340.01 (17j) should read:

340.01 (17k) “Implement of husbandry – towed equipment”:

(a) Means a piece of equipment or machinery designed for agricultural purposes, used exclusively in the conduct of agricultural operations for off-road agricultural purposes, used exclusively in the conduct of agricultural operations off-road, to or from field or farm, or between field and farm, and unladen operation to and from sites of vehicle manufacture, distribution, sale, repair, storage, food, fuel and rest.

(b) Means a piece of equipment or machinery designed for tillage, planting, and harvesting and designed to be pulled by an Implement of Husbandry – Farm Tractor or Implement of Husbandry – Self-Propelled Commercial Motor Vehicle (CMV).

(c) Means a trailer– mounted bulk liquid fertilizer container.

5. **Create IoH self-propelled equipment definition.** This alternative creates an IoH self-propelled equipment definition which would allow size, weight, use, driver qualifications, safety equipment, and other limitations to be applied to this category of vehicles. As a result, Chapter 340.01 (24i) should read:

340.01 (24i) “Implement of husbandry – self-propelled equipment”:

(a) Means a ~~vehicle or~~ piece of equipment or machinery designed for off-road agricultural purposes, used exclusively in the conduct of agricultural operations off-road, and used principally off the highway, or a trailer–mounted bulk liquid fertilizer container to or from field or farm, or between field and farm, and unladen operation to and from sites of vehicle manufacture, distribution, sale, repair, storage, food, fuel, and rest.

(b) Means a piece of machinery or limited purpose equipment designed to perform an agricultural function such as harvesting of crops, for example a self-propelled combine or self-propelled forage chopper.

~~(b) Does not include any motor truck, farm truck, road tractor, truck tractor, or farm truck tractor or such a vehicle combined with a semitrailer, trailer or farm trailer, when the vehicle or combination is a commercial motor vehicle operated on a highway.~~

6. **Create IoH self-propelled CMV definition.** This alternative creates an IoH self-propelled commercial motor vehicle (CMV) definition which would allow size, weight, use, driver qualifications, safety equipment, and other limitations to be applied to this category of vehicles. As a result, Chapter 340.01 (24j) should read:

340.01 (24j) “Implement of husbandry - self-propelled commercial motor vehicle”:

(a) Means a self-propelled commercial motor vehicle or converted self-propelled commercial motor vehicle or vehicle composed of significant commercial motor vehicle components that is ~~or piece of equipment or machinery~~ designed for off-road agricultural purposes, used exclusively in the conduct of agricultural operations off-road, and used principally off the highway, or a trailer–mounted bulk liquid fertilizer container to or from field or farm, or between field and farm, and unladen operation to and from sites of vehicle manufacture, distribution, sale, repair, storage, food, fuel, and rest.

~~(b) Does not include any motor truck, farm truck, road tractor, truck tractor, or farm truck tractor or such a vehicle combined with a semitrailer, trailer or farm trailer, when the vehicle or combination is a commercial motor vehicle operated on a highway.~~

(b) Means a self-propelled commercial motor vehicle chassis with features designed for farm activity and used exclusively for farm activity.

7. **Create loH train definition.** This alternative creates an loH train definition which would allow size, weight, use, driver qualifications, safety equipment, and other limitations to be applied to this category of vehicles. As a result, Chapter 340.01 (24k) should read:

340.01 (24k) “Implement of husbandry - train”:

(a) Means two implement of husbandry – towed equipment s are used primarily as implements of husbandry in connection with seasonal agricultural activities or one such trailer and any other implement of husbandry may, without such permit, be drawn by an implement of husbandry - tractor or implement of husbandry - self-propelled vehicle if the operation of such combination of vehicles is exclusively a farming operation and not for the transportation of property for hire and if the overall length of such combination of vehicles does not exceed 60 feet.

~~(a) Means a vehicle or piece of equipment or machinery designed for agricultural purposes, used exclusively in the conduct of agricultural operations and used principally off the highway, or a trailer–mounted bulk liquid fertilizer container.~~

(b) Means one implement of husbandry – tractor or one implement of husbandry – self-propelled vehicle may pull up to two implement of husbandry- towed equipment s.

~~(b) Does not include any motor truck, farm truck, road tractor, truck tractor, or farm truck tractor or such a vehicle combined with a semitrailer, trailer or farm trailer, when the vehicle or combination is a commercial motor vehicle operated on a highway.~~

8. **Create loH self-propelled CMV train definition.** This alternative creates an loH self-propelled commercial motor vehicle (CMV) definition which would allow size, weight, use, driver qualifications, safety equipment, and other limitations to be applied to this category of vehicles. As a result, Chapter 340.01 (24l) should read:

340.01 (24l) “Implement of husbandry – self-propelled commercial motor vehicle train”:

(a) Means two or combination of two implement of husbandry – CMV trailers or implement of husbandry – towed equipment s are used primarily as implements of husbandry in connection with seasonal agricultural activities or one such trailer and any other implement of husbandry may, without such permit, be drawn by an implement of husbandry – self-propelled commercial motor vehicle if the operation of such combination of vehicles is exclusively a farming operation and not for the transportation of property for hire and if the overall length of such combination of vehicles does not exceed 60 feet.

~~(a) Means a vehicle or piece of equipment or machinery designed for agricultural purposes, used exclusively in the conduct of agricultural operations and used principally off the highway, or a trailer–mounted bulk liquid fertilizer container.~~

(b) Means one implement of husbandry – self-propelled commercial motor vehicle may pull up to two or combination of two implement of husbandry- trailers or implement of husbandry – towed equipment.

~~(b) Does not include any motor truck, farm truck, road tractor, truck tractor, or farm truck tractor or such a vehicle combined with a semitrailer, trailer or farm trailer, when the vehicle or combination is a commercial motor vehicle operated on a highway.~~

9. **Review the loH definition found in 341.01 (2) (a).** In an effort to remove any ambiguity in loH definitions found within Wisconsin Statutes, any conflicting definitions should be reviewed. The purpose for review is to ensure loH applies as intended following the loH Study Group’s work and applies to the exemption found within Chapter 341.05 (17) – vehicle registration. **
Chapter 341.01 currently reads:

341.01 Words and phrases defined.

(1) Words and phrases defined in s. 340.01 are used in the same sense in this chapter unless a different definition is specifically provided.

(2) In this chapter:

(a) Notwithstanding s. 340.01 (24), “implement of husbandry” means a vehicle or piece of equipment or machinery designed for agricultural purposes, used exclusively in the conduct of agricultural operations and used principally off a highway, or a trailer–mounted bulk liquid fertilizer container.

10. **Include loH trains and loH-CMV trains in 348.08.** If alternatives 6 and 7 are adopted, then loH trains and loH self-propelled CMV trains should be updated in Chapter 348.08. As a result, Chapter 348.08 (b) should read:

348.08 (b) The following requirements and restrictions shall apply to “Implement of husbandry – trains” and “Implement of husbandry – commercial motor vehicle trains” operations, as defined in s. 340.01 (24k) and s. 340.01 (24l): Two trailers used

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~~primarily as implements of husbandry in connection with seasonal agricultural activities or one such trailer and any other implement of husbandry may, without such permit, be drawn by a farm tractor if the operation of such combination of vehicles is exclusively a farming operation and not for the transportation of property for hire and if the overall length of such combination of vehicles does not exceed 60 feet.~~

1. Two implement of husbandry – towed equipment are used primarily as implements of husbandry in connection with seasonal agricultural activities or one such trailer and any other implement of husbandry may, without such permit, be drawn by an implement of husbandry - tractor or implement of husbandry - self-propelled vehicle if the operation of such combination of vehicles is exclusively a farming operation and not for the transportation of property for hire and if the overall length of such combination of vehicles does not exceed 60 feet.

2. One implement of husbandry – tractor or one implement of husbandry – self-propelled vehicle may pull up to two implement of husbandry- towed equipment.

3. Two or combination of two implement of husbandry – CMV trailers or implement of husbandry – towed equipment s are used primarily as implements of husbandry in connection with seasonal agricultural activities or one such trailer and any other implement of husbandry may, without such permit, be drawn by an implement of husbandry – self-propelled commercial motor vehicle if the operation of such combination of vehicles is exclusively a farming operation and not for the transportation of property for hire and if the overall length of such combination of vehicles does not exceed 60 feet.

4. One implement of husbandry – self-propelled commercial motor vehicle may pull up to two or combination of two implement of husbandry- trailers or implement of husbandry – towed equipment.

Analysis/factor analysis:

In general, implements of husbandry have changed in recent years. As a result, separate definitions are proposed specifically for implements of husbandry in order to provide clarity and guidance to road users and law enforcement regarding size, weight, operating and safety equipment requirements and restrictions and other operator qualifications.

7. **No change/do nothing alternative.** Not an option at this point. It is why we have the issue today. Current laws or lack thereof leaves too much open for interpretation when dealing with law enforcement.
8. **Amend farm tractor definition.** The farm tractor definition has been considered to be out-of-date. As a result, the farm tractor definition in Wisconsin Statutes is expanded to provide more detail in the definition for clarity purposes and includes “implements of husbandry” in the title.
9. **Create an IoH CMV trailer definition.** Although a “farm trailer” has been defined in Wisconsin Statute, an IoH CMV trailer has not. Currently, towed CMV trailers have no size limitations. Furthermore, creating this definition could possibly create size limitations for this vehicle if warranted.
10. **Create an IoH towed equipment definition.** Although a “farm trailer” has been defined in Wisconsin Statute, an IoH - towed equipment has not. Currently, IoH - towed equipment have no size limitations. Furthermore, creating this definition could possibly create size limitations for this vehicle if warranted.
11. **Create IoH Self-Propelled definition.** Currently, the term “self-propelled implements of husbandry” are not clearly identified in Wisconsin Statute. Thus, establishing a definition for self-propelled implements of husbandry could possibly lead to size limitations for this vehicle if found necessary.
12. **Create IoH Self-Propelled CMV definition.** CMV converted implements of husbandry have become relatively commonplace in the state of Wisconsin. Thus, IoH self-propelled CMVs are widely used and operated in the state of Wisconsin. Currently, IoH self-propelled CMVs are regulated by following standard CMV laws and regulations, but this change would separate IoH self-propelled CMVs from other CMV definitions in Wisconsin Statute. This change would allow IoH self-propelled CMVs to have specific regulations if found necessary.
13. **Create IoH Train definition.** Although references to IoH trains can be found within Wisconsin Statutes, the terminology is vague. To clarify the vagueness in Wisconsin Statute, an IoH Train definition is recommended. Additionally, establishing a definition of an IoH Train could possibly lead to size limitations for this vehicle combination if deemed necessary.
14. **Create IoH Self-Propelled CMV Train definition.** Due to the vagueness of IoH Trains in Wisconsin Statute as previously mentioned in alternative no. 6 and due to the increased usage of IoH self-propelled CMVs, an IoH self-propelled train definition is recommended. Due to the

possible adoption of alternative no. 5 to Wisconsin Statute, this addition to Wisconsin Statute would allow IoH self-propelled CMVs to have specific regulations if found necessary as well.

15. **Review the IoH definition found in 341.01 (2) (a).** The stand-alone definition of IoH found within Chapter 341.01 should be reviewed if Alternative Definitions 2 through 7 are amended or created as definitions. Additionally, the wording “a trailer– mounted bulk liquid fertilizer container” should be removed from Chapter 341.01 (2) (a) and inserted into Chapter 340.01 (17k) (c) if the IoH Study Group recommends Chapter 341.01 (2) (a) be stricken. In an effort to remove any ambiguity in IoH definitions found within Wisconsin Statutes, any conflicting definitions should be examined to determine if the IoH definition currently found within Chapter 341.01 (2) (a) maintains the structural definition of the IoH definitions created in alternatives 2 through 7.
16. **Include IoH Trains and IoH CMV Trains in 348.08.** If alternatives 6 and 7 are adopted, it shall then be recommended that IoH trains and IoH self-propelled CMV trains should be updated in Chapter 348.08.

Conclusions/summary: Establishing clear definitions of implements of husbandry will assist in determining whether a vehicle, piece of equipment or machinery, or trailer is designed for agricultural purposes and used exclusively in the conduct of agricultural operations. Additionally, clear and concise definitions of implements of husbandry will assist in distinguishing the differences between farm tractors, implement of husbandry – self-propelled commercial motor vehicles (CMVs), and other non-CMV agricultural equipment for law enforcement and the motoring public.

Recommendation: Implementing alternative 2 through 9 is recommended. Establishing alternative 2 through 9 as definitions of IoH will clarify current statutory law.

Note:

****Chapter 340.01(24): Role of Okray decision:**

The statement in Chapter 341 is not excluding IoH-CMV from the IoH definition. Thus, exemption from registration in 341.05(17) doesn't exempt IoH-CMV from registration. But, Okray Decision (State v. Okray Produce Co., Inc. 132 Wis. 2d 145, 389 N.W.2d 825 (Ct. App. 1986)) makes IoH-CMV an IoH for registration purposes only and they are thus exempt from registration.

The Okray decision is a ruling by the Wisconsin Supreme Court. The Wisconsin Supreme Court followed three specific steps to determine if a permanently mounted “potato box” on a truck is considered an implement of husbandry. The first test is whether a vehicle is designed for agricultural purposes. That test has been met because the potato boxes are permanently attached to the trucks' chassis and have no other use than harvesting and transporting potatoes to warehouses.

The second test is whether a vehicle is used exclusively in the conduct of agricultural operations. A single non-exempt use of an otherwise exempt motor vehicle supports a conviction for operating an unregistered motor vehicle during that use. The last test is whether the vehicle is used principally off the highway. The vehicles spend virtually all their operating time either being loaded in the field or unloaded at a receiving station. Highway use accounts for a de minimis percentage of total operating time. The vehicles meet the third test.

The difference between an implement of husbandry and a farm truck is determined not so much by how the vehicle looks, but by how it is used. On the facts agreed to by the parties, the trial court properly concluded that the vehicles were implements of husbandry.

Appendix B2: Plates or Stickers

DRAFT: ISSUE PAPER

LICENSE PLATES OR STICKERS FOR COMMERCIAL MOTOR VEHICLE IMPLEMENTS OF HUSBANDRY

Issue: What motor vehicle registration fees, if any, should be charged for implements of husbandry which are commercial motor vehicles (CMV IoH), and what credentials should be issued and displayed?

Goal: Provide a visible identifier for law enforcement and the public for CMV IoH, and collect fees to support funding for enforcement of CMV laws and rural roads funds.

Problem statement: CMV IoH's operate on the public roads and are subject to enforcement of driving and vehicle equipment law, but no registration (license plate) fee is charged, nor do the vehicles display a license plate or other visible identifier.

Background/history: Wisconsin Statutes currently exempt a CMV IoH from registration and from display of license plates.

Alternatives:

11. **No change/do nothing alternative.** Continue current practice. Charge no fees and display no license plate or other identifier.
12. **Require a 12 year IOH plate for a one-time fee of \$250.** Charge a one-time fee to cover issuance cost of a multi-year vehicle registration, and provide an identifying license plate. Would cover all CMV-IoH as long as they are used within the definition of an IOH/CMV conversion regardless of farm use or as incidental hauling as part of a custom farm operation. For the same owner, a small fee could be charged for renewal. No motor vehicle title would be required.
13. **Same as 2 above, but could be a self-adhesive decal.**
14. **Require a farm truck plate, same as for other farm trucks.** This fee is 40 percent of normal truck registration fees, and is issued on an annual basis only.
15. **Require a standard truck plate at full fees.** This annual registration would also be available on a quarterly and consecutive-monthly basis, same as other heavy truck registrations.
16. **Require plates or decal – see 2 thru 5 above – only if the vehicle is being used for custom work or for-hire.**

Analysis/factor analysis:

1. **No change/ do nothing.** Not an option at this point. It is why we have the issue today. Current laws or lack thereof leaves too much open for interpretation when dealing with law enforcement.
2. **Require a 12 year non-transferable IOH plate for \$250.** Covers cost of plate with revenue left over. The proposed fee would be reflective of seasonal use. Having an IOH plate that has a good definition of uses, weights and operating parameters would greatly enhance the intended use, safety and law enforcement's ability to have a law to enforce.

This would require an improved definition of the CMV-IoH in order to provide more clear guidance to vehicle owners and to law enforcement. The current definition includes a hard-to-quantify reference to “principally off-road”. Design and origin/destination elements would provide more clear guidance pertinent to the distinction between CMV-IoH and farm truck.

Recommendation: Create an improved IoH-CMV definition along the lines of the following, and require and issue the registration described above. This is based on ss. 341.01(24), Wisconsin Statutes.

(24j) “Implement of husbandry-commercial motor vehicle”:

(a) Means a commercial motor vehicle or converted commercial motor vehicle or vehicle composed of significant commercial motor vehicle components that is designed for off-road agricultural purposes, used exclusively in the conduct of agricultural operations off-road, to or from field or farm, or between field and farm, and unladen operation to and from sites of vehicle manufacture, distribution, sale, repair storage, food, fuel and rest.

3. **A decal.** A decal could be in bright color and larger and thus be more distinctive, and perhaps at lower cost.
4. **Require a farm truck plate, same as for other farm trucks.** Covers cost of plate with revenue left over. The fee schedule proposed would not be consistent with use, due to the fact that the vast majority of the CMV-IoH’s are seasonal\limited use (less than 16 weeks of the year), depending upon the specific use of the CMV-IoH. Would also be too distracting to law enforcement due to the wide area that a farm plate covers, and would also leave CMV-IoH’s open to interpretation from law enforcement.
5. **Require a standard truck plate at full fees, and allow for-hire operation.** Same as item 3. Covers cost of plate with revenue left over. The fee schedule proposed would not be consistent with seasonal use, due to the fact that the vast majority of the IOH’s are seasonal\limited use (less than 16 weeks of the year) depending upon the specific use of the IOH. Would also be too distracting to law enforcement due to the wide area that a farm plate covers, and would also leave IOH’s open to interpretation from law enforcement. And there is virtually no way to differentiate between the farm use and for-hire.
6. **Require plates or decal only for custom or for-hire work.** While an imperfect indicator, the absence of the plate or decal would imply that operation is own-farm only. The presence of the plate or decal would indicate that although operation may be own-farm, it may also be customer or for-hire under which circumstances driver and hours of service requirements would apply.

Conclusions/summary: An improved definition identifying the IoH-CMV, and the requiring of vehicle registration and license plates would assist in identification of this category of commercial motor vehicles used exclusively for agricultural purposes. Identification would promote uniform compliance and enforcement.

Appendix B3: Exemptions for Commercial versus Farm Operations

DRAFT: ISSUE PAPER

CUSTOM FARM OPERATIONS BY FARM OWNERS/OPERATORS

Issue: How should driver and equipment safety laws be applied when farm owners/operators perform work for compensation for other farms with commercial motor vehicles?

Goal: That stand-alone custom farm business operators not be disadvantaged compared to farm owners/operators who also perform custom farm operations. And that highway safety not be reduced.

Problem statement: Some farm owners/operators perform farm operations for other farms, with commercial-motor-vehicle implements-of-husbandry (CMV IoH), and with standard commercial motor vehicles. Some farm owners/operators don't comply with equipment safety requirements that apply to all CMV's.

This increases highway safety risks; and by reducing costs, allows them to unfairly undercut the prices of custom farm business operators that do meet existing CDL, vehicle safety, and vehicle safety program requirements.

Background/history: Farm owners/operators can haul their own products without CDL's up to certain distances. They are required to have a USDOT number for trucks over 10,000 pounds, and are required to meet other vehicle safety equipment requirements for these vehicles.

MAP 21 further expanded exemptions for farm owners/operators, employees and family members, including exempting them from drug testing requirements, safety programs, annual vehicle safety equipment inspections and hours of service limits.

We are researching whether MAP-21 exemptions apply to operations with respect to farms that are not owned or operated by the vehicle owner.

Alternatives:

1. **No change/do nothing alternative.**
2. **Increase education of farm owners/operators.** Increase education specifically with respect to CDL requirements, and to equipment requirements; and if MAP-21 exemptions do not apply to operations with respect to farms not owned/operated by the vehicle owner, then also increase education on the full range of non-exempt requirements.
3. **WisDOT create a farm vehicle handbook.** This would describe equipment and operating requirements, size and weight limits, and driver qualification requirements, and would be available on the web.
4. **Increase enforcement.** This could be done immediately, or following a multi-month period of education.

5. **Increase funding for education and enforcement.** Fees for farm license plates could be increased to meet the apparent education and enforcement needs, with increased funding going to state patrol and local law enforcement for education and enforcement.
6. **Ensure an even playing field, and safety implications.** Custom farm operators using Implement of Husbandry Commercial Motor Vehicles (IoH-CMV's) must currently meet standard CMV safety requirements which have a cost, while farm operators performing the same work with the same vehicles have exemptions for CDL, hours of operation, drug and alcohol testing and CMV safety program requirements. With the weight and speed of these vehicles, research could identify if the exemptions are associated with higher crash rates for exempt operations.

Analysis/factor analysis:

The research referred to above regarding where MAP-21 exemptions apply, will need to be completed.

Increasing education efforts through farm magazines and other avenues could help farm owners/operators fully recognize the requirements and recognize that the push is on.

Conclusions/summary: A coordinated effort of education and enforcement, supported by increased funding could address the highway safety and business fairness issues.

Recommendation: Pursue legislation to implement Alternatives 2 through . Pursue research for Alternative 6.

Appendix B4: Accommodation of Pipelines

DRAFT: ISSUE PAPER

Accommodation of pipelines to support transport of liquid manure

Issue: How should requests for accommodating pipelines or temporary lines to transport liquid manure across public rights-of-way be addressed.

Goal: Improve efficiency of transport while preserving highway infrastructure by using pipelines when feasible.

Problem statement: Liquid manure transport typically involves very heavy vehicles in configurations that put excessive stress on highway infrastructure, often when roadways are unable to reasonably handle these loads. Seeking to overcome obstacles so that pipeline transport is viable could avoid infrastructure damage and highway operational issues while allowing large application equipment to operate as designed and avoiding impacts of seasonal road weight limits.

Background/history: Wisconsin farmers are increasingly dealing with liquid manure that needs to be transported from collection and storage tanks or lagoons to fields where it is applied. Transport is time sensitive and often is impacted by weight limitations due to thaw conditions. Pipelines are a means of transporting liquids that can avoid road use, but are sometimes not workable due to limitations on accommodation of the lines to cross public rights of way.

Alternatives:

1. **No change/do nothing alternative.** Crossings permitted subject to conditions for state highways; local road depend on clear authority to permit and understanding of impacts.
2. **Promote consideration of crossings.** Share information about WisDOT permit practices for consideration by local authorities and to inform ag industry of availability of state permits
3. **Propose statutory changes to clarify and highlight permit potentials for these crossings.** Determine if impediments exist for local permits; if so, propose statutory changes.
4. **Propose statutory changes that also provide authority for longitudinal accommodation.** Create broad authority to issue permits to accommodate pipelines for liquid manure/nutrients including longitudinally in right of way when need is demonstrated, under specific conditions.

Analysis/factor analysis:

Permits may provide mutual benefits (efficiencies, avoidance of traffic and roadway impacts) subject to economics of modified farm operations. Risks of pipeline failures can be addressed. Change may be affected by neighbor concerns if field application practices change.

Conclusions/summary: Opportunities may be able to solve some portion of the liquid transport need, but is not a total solution.

Recommendation: Dependent on policy workgroup reaction.

Outreach/education plan: Inform permit agencies of authority and benefits from employing that authority. Provide adequate time for local processes to be developed. Share potential for accommodation through agricultural associations and project date when permits may be available.

Appendix C: Policy Conflicts Matrix

DRAFT: Appendix C: Policy Conflicts—Width, Height, and Length Statutes				
Last Updated: 01/28/2013	Policy Conflicts	Current Statutory Definition	Current Statutory Definition	Current Statutory Definition
Ag Equipment	Definition	Current Statutory Definition	Current Statutory Definition	Current Statutory Definition
Category I. Farm Tractor Proposed by IoH Study Group (Please see IoH Definitions Issue Paper):	Shorthand Multi-purpose farm tractor designed and used to tow farm equipment, with or without fully-mounted or semi-mounted equipment attached.	Width Statutes—Chapter 348.05 Width - 348.05 Maximum legal width is 8 foot 6 inches 348.05(2)(a) No limitation for implements of husbandry temporarily operated upon a highway in the course of performance of its work. 348.05(2)(c) 12 feet for farm tractors, except that the total outside width of a farm tractor shall not exceed 9 feet when operated on the Interstate. 48.05(2)(L) 12 feet for loads of hay if the total outside width of the loads do not exceed the width of a single traffic lane of any highway over which the loads are carried. Not allowed on the Interstate.	Height Statutes—Chapter 348.06 Height - 348.06 Maximum height is 13 feet 6 inches 348.06(2) Implements of husbandry of any height may be temporarily operated upon a highway.	Length Statutes—Chapter 348.07 Length - 348.07 348.07(1) Single vehicle = 45 feet Combination of 2 vehicles = 70 feet (11-1-12) 348.07(2)(e) No length limitation for implements of husbandry temporarily operated upon a highway.
II. Self-Propelled Equipment Proposed by IoH Study Group (Please see IoH Definitions Issue Paper):	Limited purpose self-propelled equipment designed to perform an agricultural function such as harvesting of crops, for example a self-propelled combine or self-propelled forage chopper.	348.05(3) Farm tractors exceeding 12 feet in width and all other farm machinery and implements of husbandry exceeding 8 feet 6 inches in width not being operated in the course of performance of its work may be moved, towed or hauled over the highways without a special permit between one-half hour before sunrise and sunset-Mondays to Thursdays from one-half hour before sunrise to 2 p.m.- Fridays. Not allowed on Saturday and Sunday. Not allowed on the Interstate.	348.06(3) The total height stated in this section shall not be construed as requiring a clearance of such height or as relieving the owners of vehicles not exceeding such total height from liability for any damage.	Must always follow weight laws in Chapter 348.15. Farmer or Rancher—Exempt from CDL Standards, Requirements, Controlled Substance, Physical Qualifications, HOS, Inspection, Repair, and Maintenance. Non-Farmer—No License if in performance of work. Class D for all other. Hours of Service—Not Applicable Safety Inspections—Not Applicable Subject to fine violations. Can obtain a permit (single trip & multi-trip)
III. Self-Propelled CMV Proposed by IoH Study Group (Please see IoH Definitions Issue Paper):	A self-propelled commercial motor vehicle chassis with features designed for farm activity and used exclusively for farm activity	348.09(2) This section applies even though the total width of the vehicle and load does not exceed 8 foot 6 inches.	Projecting loads—Side- 348.09(1) No person may operate any motor vehicle, trailer or semitrailer carrying any load extending beyond the fender line on the left side or beyond the fender line on the right side.	Must always follow weight laws in Chapter 348.15. Farmer or Rancher—Exempt from CDL Standards, Requirements, Controlled Substance, Physical Qualifications, HOS, Inspection, Repair, and Maintenance. Non-Farmer—Must obtain CDL. Hours of Service—FMCSA 49 CFR Part 395 Safety Inspections—FMCSA 49 CFR Part 396 Subject to fine violations. Can obtain a permit (single trip & multi-trip) Considered an Implement of Husbandry?
IV. IoH Train Proposed by IoH Study Group (Please see IoH Definitions Issue Paper):	A farm tractor towing one or more non-powered farm vehicles. (IoH trailers).	348.10 - Special limitations on load. 348.10(1) Load can extend no more than 3 feet to the front 348.10(2) No person shall operate a vehicle on a highway unless such vehicle is so constructed and loaded as to prevent its contents from dropping, shifting, leaking or otherwise escaping there from. 348.10(5) The load imposed upon trailers or semitrailers shall be distributed in a manner that will prevent side sway under all conditions of operation 348.10(5)(a) All items of load carried by any trailer, semitrailer or mobile home exceed bulk material such as sand, gravel, dirt not in containers shall be secured to, on or in the trailer to prevent shifting of the load.	Must always follow weight laws in Chapter 348.15. Farmer or Rancher—Exempt from CDL Standards, Requirements, Controlled Substance, Physical Qualifications, HOS, Inspection, Repair, and Maintenance. Non-Farmer—No License if in performance of work. Class D for all other. Hours of Service—Not Applicable Safety Inspections—Not Applicable Subject to fine violations. Can obtain a permit (single trip & multi-trip)	Must always follow weight laws in Chapter 348.15. Farmer or Rancher—Exempt from CDL Standards, Requirements, Controlled Substance, Physical Qualifications, HOS, Inspection, Repair, and Maintenance. Non-Farmer—Must obtain CDL. Hours of Service—FMCSA 49 CFR Part 395 Safety Inspections—FMCSA 49 CFR Part 396 Subject to fine violations. Can obtain a permit (single trip & multi-trip) Considered an Implement of Husbandry?
V. IoH Self-Propelled CMV Train Proposed by IoH Study Group (Please see IoH Definitions Issue Paper):	An IoH Self-Propelled CMV towing one or more non-powered farm vehicles (IoH trailers).	Must always follow weight laws in Chapter 348.15. Farmer or Rancher—Exempt from CDL Standards, Requirements, Controlled Substance, Physical Qualifications, HOS, Inspection, Repair, and Maintenance. Non-Farmer—No License if in performance of work. Class D for all other. Hours of Service—Not Applicable Safety Inspections—Not Applicable Subject to fine violations. Can obtain a permit (single trip & multi-trip)	Must always follow weight laws in Chapter 348.15. Farmer or Rancher—Exempt from CDL Standards, Requirements, Controlled Substance, Physical Qualifications, HOS, Inspection, Repair, and Maintenance. Non-Farmer—No License if in performance of work. Class D for all other. Hours of Service—Not Applicable Safety Inspections—Not Applicable Subject to fine violations. Can obtain a permit (single trip & multi-trip)	Must always follow weight laws in Chapter 348.15. Farmer or Rancher—Exempt from CDL Standards, Requirements, Controlled Substance, Physical Qualifications, HOS, Inspection, Repair, and Maintenance. Non-Farmer—Must obtain CDL. Hours of Service—FMCSA 49 CFR Part 395 Safety Inspections—FMCSA 49 CFR Part 396 Subject to fine violations. Can obtain a permit (single trip & multi-trip) Considered an Implement of Husbandry?