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Current and Emerging Issues for Ag Tech

Does GDPR Apply to Ag Data?

With the May 24, 2018 deadline for compliance the European Union's General Data Protection Regulation (GDPR), ag data companies may be wondering whether their privacy policies need to be in compliance with the EU's regulation. This is the first in a series of posts on GDPR and its impacts on north American ag data platforms.

This post will answer the threshold question: Does the GDPR apply to collection of ag data in North America?

To answer this question, two definitions from the GDPR are important: "personal data" and "ag data."

The GDPR applies only to "personal data" collection. Personal data is defined in the GDPR as:

any information relating to an identified or identifiable natural person ("data subject"); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person.

GDPR, Art. 4, 1. There is lot in that paragraph, so let's break it down into its constituents. The first required element here is that personal data is from a "natural person." This means data generated by tractors, farm equipment, cows, or pigs are not covered by the GDPR--only data related to people.

The second required element is that the data contains "reference to an identifier" tied to that natural person. The definition gives us lots of examples, including name, ID numbers, location data, and other identifiers related to physical, physiological, genetic or cultural characteristics.

Of these, only "location data" potentially applies to ag data since yield data, planting data, machine data, etc. all include location information. Still, I do not think that is enough to bring ag data into the definition of the GDPR's "personal data" since these data streams are not tied to, or related to, a natural person.

My conclusion might be different if an ag data platform recorded location information about specific employees which is cross-referenced to collected ag data. For example, if a platform recorded not only machine location data but also which employee was driving that machine, this might pull "machine data" into GDPR's personal data definition.

In general, however, ag data is not "personal data." GDPR authorizes organizations to create "codes of conduct" for specific data uses. A number of EU farm organizations recently created an EU Code of Conduct on Agricultural Data Sharing by Contractual Agreement. This document defines "ag data" as inclusive of a number of data streams, including: farm operation data, agronomic data, compliance data, livestock data, machine data, service data, agri-supply data, and agri-service provider data. These definitions are different than "personal data" since they are not tied to a natural person.

Back to the question: does the GDPR extend to protect ag data? In general, the answer is "no," ag data is not "personal data." But, there may be examples where ag data does fit within this definition. All ag tech providers should examine this issue for their unique situation.

What Does it Mean to Be “Ag Data Transparent”?

John Deere's announcement that it had [certified the John Deere Operations Center as "Ag Data Transparent"](#) this week might have you wondering, what exactly does that mean? This post answers that question. But first, a quick history lesson about how we got here.

Ag Data's Core Principles

In 2014, American Farm Bureau Federation (AFBF) observed that many of its farmer-members were concerned about the variety of new ag data products that were arriving on the market. What would happen to ag data once provided to these platforms? Would the tech providers use this data for their own purposes? Could the farmer ever get this data back? Should they trust these providers, which included legacy companies like John Deere that were developing new cloud-based products, as well as new start ups from Silicon Valley and the Midwest?

To address these concerns, AFBF hosted a series of meetings with representatives of other interested farm groups, such as American Soybean Association, National Corn Growers, National Association of Wheat Growers, National Farmers Union, and National Sorghum Producers. These organizations had similar concerns.

Ag tech providers were also invited. Representatives from the big equipment manufacturers were there: Deere, CNH, AGCO, as well as large seed and chemical companies, Dow, DuPont, and Monsanto. Smaller and start-up ag tech companies were there too. (I was fortunate to attend a couple of these meetings.)

After a series of these meetings, the group drafted *The Privacy and Security Principles for Farm Data*, or what today we call ag data's "*Core Principles*." These Core Principles represented basic guidelines that ag tech providers should follow when collecting, using, storing, and transferring farmers' ag data. After publishing, 37 different companies signed onto the Core Principles, pledging to incorporate them into their contracts with farmers.

The Ag Data Transparent Seal

Of course, a pledge to follow non-binding guidelines is good, but incorporating the Core Principles into actual data contracts is much better.

To verify compliance with the Core Principles, AFBF and the other interested organizations and companies formed the Ag Data Transparency Evaluator, Inc., a non-profit organization (ADT) to audit companies' ag data contracts. This organization developed the Ag Data Transparent seal of approval (above). Much like the Good Housekeeping seal of approval verifies compliance with Good Housekeeping's standards, the Ag Data Transparent seal recognizes compliance with the Core Principles.



How do companies get the Ag Data Transparent seal?

Companies that want to be recognized as Ag Data Transparent must submit their contracts with farmers for certification to the ADT. In addition, companies must answer 10 questions about how they collect, store, use, and share farmers' ag data. The contracts and answers to the 10 questions are then reviewed by a third party administrator* for accuracy. If the answers match what the company's contracts say, the Ag Data Transparent seal is awarded. If there is a discrepancy, the company is required to make a change before the seal is awarded.

Each of the 10 questions is based upon one or more of the Core Principles. For example, one principle is *portability*--farmers should be able to move ag data from one platform and use it in another. Accordingly, question 4 asks: *After I upload data to the Ag Tech Provider, will it be possible to retrieve my original complete dataset in an original or equivalent format?*

Participating companies must answer yes or no and provide an explanation. The final results are posted only at the [Ag Data Transparent website](#) so that farmers, agronomists, and other ag professionals can review. The results also include hyperlinks to the companies' ag data contracts, in case someone wants to more closely examine a particular answer.

When a participating company changes or updates its ag data contracts, the company's answers must be updated as well if they want to continue to use the Ag Data Transparent seal.

What can you do to help?

Many companies that collect ag data have not yet agreed to follow the ag data Core Principles. (Read: [Few Big Ag Companies have yet to follow through on data transparency pledge](#)). This should be step one. Many have signed onto the Core Principles, but not achieved the Ag Data Transparent certification. This should be step two.

Ask your ag tech provider to incorporate the Core Principles into their contracts with farmers. Ask your provider to become Ag Data Transparent. Congratulate those companies that have already taken these steps.

What Does Blockchain Mean for Agriculture?

One of my predictions for 2018 was that we would start hearing about blockchain implications for agriculture. But I did not expect it would be this quick.

On January 22, 2018, Reuters reported that a [Louis Dreyfus Co. transported a shipload of soybeans](#) from the US to China using blockchain as to documentation tool. The sales contract, letter of credit and certificates were digitalized on the Easy Trading Connect (ETC) platform.

The US soy shipment did not involve Bitcoin or other cryptocurrency, which often goes hand-in-hand with blockchain, but it is still a big step.

For those new to blockchain, think of it as decentralized ledger recording various transactions in a process. Rather than record transactions in a central, single database, blockchain syncs various databases together creating a digital record that, in theory, is difficult to tamper with or hack. Bitcoin is a blockchain.

Blockchain, as it was used here, simplified the paperwork necessary to transport and transfer a shipload of soybeans.

The real challenge for agriculture will be figuring out how to combine blockchain record keeping with easy to move funds from buyers to sellers.

Still, the US soy transaction is a sign that blockchain has some real potential for transfer of agricultural commodities. Blockchain can help simplify record keeping, documentation of payment, and traceability. Reducing these burdens on agriculture should reduce transaction costs, and as a result, ultimately return more money to the farmer.

Will OSHA be an Obstacle for Robotic Farm Equipment?

The talking points surrounding robotic farm equipment usually focus on the decreased need for humans to interface with machines. We use words like "driverless" and "autonomous" to describe the lack of human involvement with farm equipment. Marketers talk about the shortage of farm labor and the ability to do more with fewer employees. For the most part, as long as driverless machinery stays in the field and off of public roads, there are few regulations that prevent these new technologies.

But what about farm-worker safety around autonomous farm vehicles?

Perhaps this is the question that drove California to add regulations prohibiting driverless machinery unless a person remains at the wheel (somewhat defeating the point). California's OSHA regulations require all "self-propelled equipment" to have an operator "stationed at the vehicular controls" whenever the machine is moving. There is an exception for furrow guided equipment, which allows an operator to control the vehicle remotely provided he or she stays within 10 feet of the controls and the equipment is not moving at greater than 2 mph.

Here is the full text of the [California OSHA regulation](#):

All self-propelled equipment shall, when under its own power and in motion, have an operator stationed at the vehicular controls. This shall not prohibit the operator occupying or being stationed at a location on the vehicle other than the normal driving position or cab if controls for starting, accelerating, decelerating and stopping are provided adjacent and convenient to the alternate position. If the machine requires steering other than ground or furrow steering or operates at ground speeds in excess of two miles per hour, steering controls shall also be provided at the alternate location.

Seedling planters and other similar equipment traveling at a speed of two miles an hour or less where a control that will immediately stop the machine is located at the operator's work station will satisfy this requirement.

Furrow guided self-propelled mobile equipment may be operated by an operator not on the equipment provided that all of the following are complied with:

(A) The operator has a good view of the course of travel of the equipment and any employees in the immediate vicinity.

(B) The steering controls, when provided, and the brake and throttle controls are extended within easy reach of the operator's station.

(C) The operator is not over 10 feet away from such controls and does not have to climb over or onto the equipment or other obstacles to operate the controls.

(D) The equipment is not traveling at over two miles per hour ground speed.

I have not found any other states that have imposed similar restrictions on driverless farm equipment. The federal OSHA regulations, upon which state regulations are based, do not include this driverless prohibition.

I understand that California agriculture includes a number of specialty crops that require slow moving farm equipment saddled with many workers close by on implements or in the field. This regulation appears to be aimed at protecting those workers' safety. However, I can't help but think this is also road block for new driverless farm technologies--at least in California.

If you are aware of other laws or regulations that restrict driverless technologies on the farm, please let me know.

Can an Ag Tech Provider Collect Data without Your Consent?

During a recent webinar, an audience member asked: "Can a machine track and send data to the manufacturer without the owner's consent?" I think you could even broaden this question to ask: "Can a machine can send data to a manufacturer without the owners' knowledge?"

From my research, the general answer to this question is "yes." A manufacturer can track information from their machine and send that data back to the manufacturer without the owner's consent, or even without the owner's knowledge.

There are likely many exceptions to this general answer, however. If the transmission of data includes personally identifiable information, the transmission may be subject to certain state laws protecting personal information.

There are also state statutes and common law that protect person's right to privacy. Unauthorized data sharing from a machine might violate these statutes or case law. For example, a machine that collects video might collect images that would be protected by certain state privacy statutes.

[The Privacy and Security Principles for Farm Data](#) provide this guidepost for this issue:

An ag tech provider's collection, access and use of farm data should be granted only with the affirmative and explicit consent of the farmer. This will be by contract agreements, whether signed or digital.

This principle is not legally binding, but a court may look to statements like this as what is commonly accepted practice in the ag tech industry. This could be helpful when determining what is the expected standard of care for an ag tech provider.

Tesla collects data from its drivers' cars. Here is what Tesla asks its customers before collecting video information:

We are working hard to improve autonomous safety features and make self-driving a reality for you as soon as possible.

In order to do so, we need to collect short video clips using the car's external cameras to learn how to recognize things like lane lines, street signs, and traffic light positions. The more fleet learning of road conditions we are able to do, the better your Tesla's self-driving ability will become.

We want to be super clear that these short video clips are not linked to your vehicle identification number. In order to protect your privacy, we have ensured that there is no way to search our system for clips that are associated with a specific car.

Please click "I accept" below in order to allow us to collect these clips. You can change or mind at any time. (Quote from Electrek.com)

I think Tesla has the correct approach. It is OK to collect data from your customers, but ask first, anonymize the information, and give customers the option of changing their mind later. Put this in your contract.

As attorneys we often tell clients: Just because something is legal, does not mean it is advisable. The same is true with collecting data without affirmative consent.

What's Old is New Again: What New Holland's Methane Tractor Means for Ag

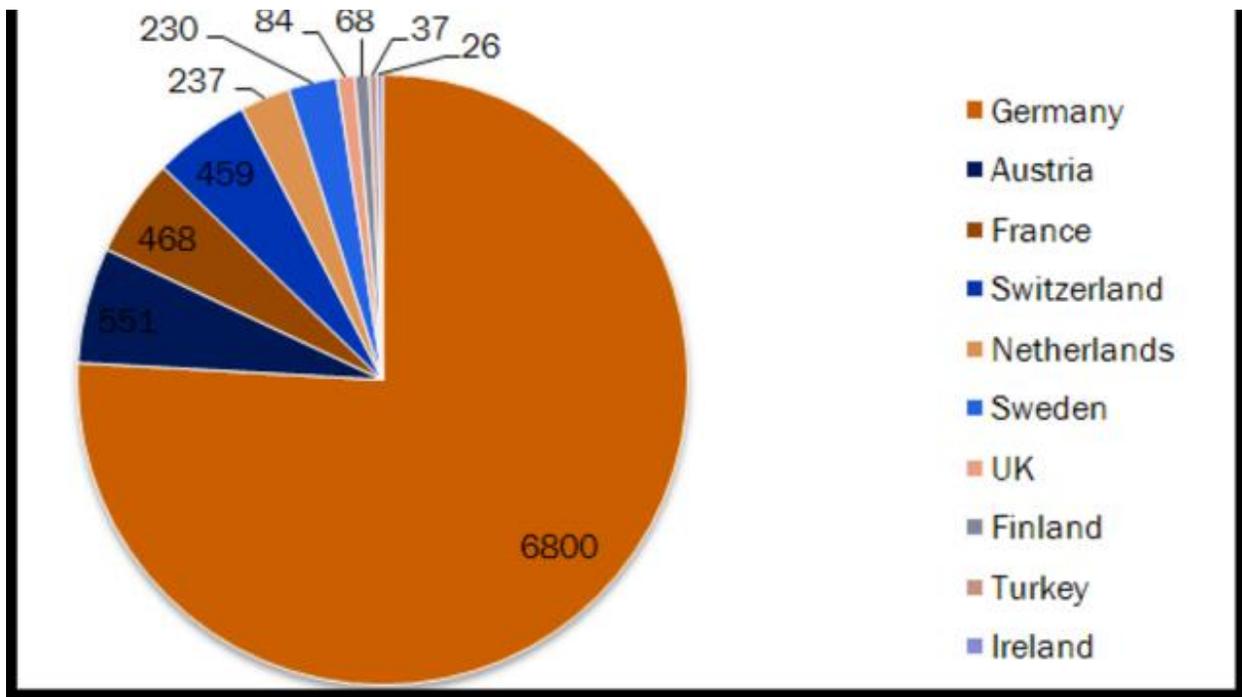
At a recent Farm Progress Show, New Holland rolled out a new concept tractor that appeared mostly conventional but had one stand out feature--it runs on methane rather than diesel. My first impression when seeing this was--*didn't we have this same concept 50 years ago?* Growing up, our farm included an International 504 LP that ran on natural gas (until it spectacularly caught on fire when I was about 10). Is the New Holland concept any different?

The New Holland tractor unveiled at Farm Progress Show is powered by a 180 hp bio-methane engine. New Holland (CNH) claims that it has identical performance to a diesel tractor but produces ultra-low emissions and a "virtually zero CO2 profile." Another benefit is a 50% reduction in drive-by noise levels, making the tractor well suited to livestock operations. Read more about the concept at [CNH's website](#).

This made me think back to the popularity of LP tractors during my childhood. John Deere, Case, IH, Ford, and others all had LP tractors on the market in the decade that preceded my farming youth. These machines took advantage of low LP prices that made these models more economical in some parts of the US than their diesel or gas equivalents.

New Holland's methane tractor is different because it addresses different problems. Sustainability is the holy grail of farming. If farms can be self-sustaining and energy independent, there is no reason they cannot continue for generations to come. Sustainable farms must produce not only food, but energy too.

There are relatively few farms in the US that generate methane, but other countries have widely embraced construction and use of anaerobic digesters on farms. Here is a graph from 2011 that shows farms in the European Union with anaerobic digesters. Germany had 6800. The entire US at this time had 167. (Indiana had 7). Farmers I've talked to say the cost/benefit does not work in the US unless you are a really large livestock farm.



SOURCE: CENTER FOR CLIMATE AND ENERGY SOLUTIONS

The New Holland methane tractor concept also addresses climate change concerns. If powered by methane generated by a farm, the resulting CO2 emissions are "virtually zero" according to CNH. Many in the US may think climate change irrelevant, but the issue is arriving on US farms whether farmers embrace it or not. I see climate change in contracts between farmers and purchasers of raw farm products more and more. For example, many milk purchasers are starting to require the farms

they purchase milk from to reduce their carbon emissions. How long before certain countries only buy "low-carbon" grain. A methane tractor could help these farms produce products that meet these standards.

When my grandfather purchased an International LP tractor he likely didn't even know that its emissions were less than the diesel equivalent. How ironic that the 1950's technology is new once again, but for entirely different reasons.

Breaking Down Ag Data Ownership

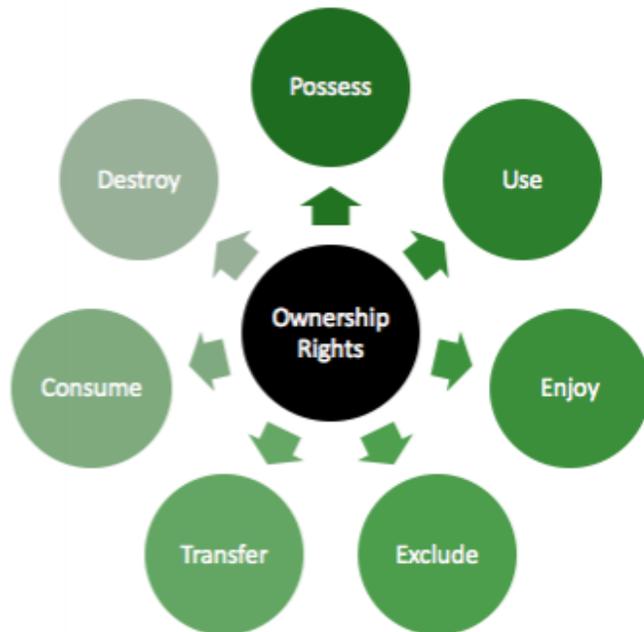
Over two years has passed since American Farm Bureau Federation (AFBF) led an industry coalition to address issues of surrounding ag data ownership, privacy, and security. When AFBF published the "[Privacy and Security Principles for Farm Data](#)"--or as I call them, the ag data's "Core Principles," I expected the industry uptake to be swift. Companies enthusiastically signed on. But here we are, two years later, and many ag tech providers still do not get it--ag data is not just 1s and 0s, but proprietary information that should be grounded in an ownership principle.

The Core Principle's statement on "ownership" was pretty easy to understand:

***Ownership:** We believe farmers own information generated on their farming operations. However, it is the responsibility of the farmer to agree upon data use and sharing with the other stakeholders with an economic interest, such as the tenant, landowner, cooperative, owner of the precision agriculture system hardware, and/or ATP etc. The farmer contracting with the ATP is responsible for ensuring that only the data they own or have permission to use is included in the account with the ATP.*

You could break this down into a few parts. First, the general principle is **that farmers own the data created on their farms**. Second, there are multiple stakeholders that may have an interest in the farmer's data when using online platforms. Third, farmers are responsible for making sure the data they upload is theirs, or used by permission. This ownership principle is fairly straightforward.

What is ownership?



"Ownership" as a legal concept is more complicated. You can only own something if the law recognizes that an ownership right. "Ag Data" is not a traditionally recognized type of property, subject to ownership. In the US, our laws recognize ownership of real property (land), improvements (buildings), personal property (goods), and even animals. Ag data is none of these.

US laws also recognize ownership of "intellectual property" or "IP" in a few instances. You can own a patent on a new invention. You can own a trademark or service mark. You can own a copyright in an original literary, musical, theatrical or other creative work. Ag data doesn't fit into these traditional IP classifications.

That leaves only two options for establishing ownership of ag data. The first option is to view ag data a farmer's "trade secret." The Uniform Trade Secrets Act, which has been adopted in similar forms in most states, defines a trade secret as:

Information, including a formula, pattern, compilation, program, device, method, technique, or process, that: (i) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use, and (ii) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

In short, a trade secret is something that only the farmer knows, that has economic value to the farmer, and that another person could not easily identify or reverse engineer.

Not all ag data fits this definition. Not all ag data are protected trade secrets. But clearly some ag data is the type of information that a farmer considers his or her trade secret.

The other option for recognizing ownership in ag data is legislative. Congress could enact laws that protects ag data, prohibiting copying or distributing without a farmer's consent. Congress has done this medical data, for example (HIPAA). But nothing like this exists for ag data.

All of this points to one fact. Whether a farmer owns his or her data after transferring it to a cloud-based platform is dependent on the contracts the farmer signs with the provider. If the contracts do not treat ag data as a protected trade secret, saying the farmer owns their data is an empty promise. Ownership means nothing if the farmer has no control.

Before signing up for an ag data platform, farmers should ask what the provider's position is on ag data ownership. Farmers can also look on the [Ag Data Transparent](https://www.agdatatransparent.com) website (www.agdatatransparent.com) and see how the provider answered that question when under review. If the provider is not "Ag Data Transparent" certified, farmers should ask why.



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Outline for Analyzing Federal Motor Carrier Safety Administration Regulation: Applicability for Agriculture

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The Agricultural & Food Law Consortium, led by the National Agricultural Law Center, is a national, multi-institutional collaboration designed to enhance and expand the development and delivery of authoritative, timely, and objective agricultural and food law research and information.



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Recent regulations written by the Federal Motor Carrier Safety Administration (FMCSA) have led to much concern in the agricultural industry. While a waiver from compliance with the ELD requirements for persons transporting of “agricultural commodities” is in place until June 18, 2018, and another waiver from the ELD requirements exists for persons transporting of livestock and insects is in place until September 30, 2018, once these regulations go into effect they impose requirements on vehicles hauling property, including horses and livestock. The rules are complex and can be confusing, particularly for people involved in agriculture, stock and horse showing, and rodeoing who may have never dealt with this type of regulations before. This outline, focused specifically on agriculture, attempts to assist a hauler in determining whether the requirements of a commercial driver’s license, hours of service records, or an electronic logging device may apply. Importantly, this outline **does not** address state-level hauling regulations that may differ from these federal rules. Drivers should consult with their state Department of Transportation with any questions as to state rules and regulations.

1. Am I operating my vehicle in “commerce?”

a. The FMCSA regulations, including ELD, HOS, and CDL requirements, apply only if a person is operating a vehicle “in commerce.” State-level requirements, such as the requirement that a driver have a CDL, may apply regardless of whether “commerce” is involved.

The information contained in this factsheet is provided for **educational purposes only**. It is **not legal advice**, and is not a substitute for the potential need to consult with a competent attorney licensed to practice law in the appropriate jurisdiction.

- b. Under the federal regulations, the definition of “commerce” is broadly written: “commerce” is “trade, traffic, or transportation in the United States.”
- c. The FMCSA guidance documents, however, articulate a more narrow definition.
 - i. FMCSA states that a vehicle is not traveling “in commerce” and, therefore, is not required to comply with FMCSA regulations if the vehicle is “non-commercial” or is “not business related.” They further explain this to be a situation where a driver is not “engaged in an underlying business related to the move” and is not hauling for compensation.
 - ii. Scholarship or prize money being offered does not mean that the transportation is necessarily business related.
 - iii. Examples of this, taken from FMCSA guidance:
 - 1. Hauling horses or livestock to shows and events when the transportation in question is not business related;
 - 2. Transportation unrelated to an agricultural business, such as a cattle rancher that owns horses for personal use, unrelated to that cattle ranch.

2. If I am operating my vehicle in “commerce,” am I operating in “interstate” or “intrastate” commerce?

- a. Under the FMCSA regulations:
 - i. “Interstate commerce” is trade, traffic, or transportation involving the crossing of a state boundary.
 - ii. “Intrastate commerce” is trade, traffic, or transportation within a single state.
- b. If a person is engaged in interstate commerce, he or she is subject to all federal FMCSA regulations, including each of the ones outlined below.
- c. If a person is engaged in intrastate commerce, he or she is subject to the federal CDL requirements, as well as any CDL requirements specific to the state in which the person operates. The person is not subject to the federal FMCSA requirements for ROD and ELD outlined below, but is responsible to comply with any state-level requirements, which may or may not mirror these federal requirements. Please contact your state Department of Transportation or similar department for more information.

Each state establishes its own CDL requirements, but minimum federal standards must be met. The below outline reflects federal standards, including the “covered farm vehicle” exception.

3. What is the “Gross Combination Weight Rating” (GCWR), “Gross Vehicle Weight Rating” (GVWR), and “Gross Vehicle Weight” (GVW) for my vehicle?

- a. GCWR is the value specified by the manufacturer of the power unit if displayed on the FMVSS certification label, or the sum of the gross vehicle weight ratings (GVWR) or gross vehicle weights of the power unit and the towed unit, whichever is greater.
- b. The GVWR is an amount specified by the manufacturer as the loaded weight

Example: *For a Ford F-250, the GCWR ranges between 19,500-25,700. The GVWR is 10,000. For a 11’ x 6’ x 7’ bumper pull stock trailer and for a 12’ x 6’ x 6’6” gooseneck trailer, the GVWR is 7,000. Thus, the GCWR of 25,700 is greater than the GVWR for the pickup and trailer of 17,000. As a result, you would use the GCWR*

of a single vehicle. This is generally printed on a sticker applied to the trailer, perhaps on the escape door or on the frame.

- c. GVW is the actual weight of the vehicle.
- d. GCW is the actual weight of the vehicle and towed unit.

4. Do I need a Commercial Driver's License (CDL)?

a. Required for operator of a "commercial motor vehicle" (CMV) in interstate, foreign, or intrastate commerce.

b. What is a "CMV?"

i. A motor vehicle or combination of motor vehicles used in commerce to transport passengers or property if the vehicle is a:

1. Combination Vehicle (Class A): Has a GCWR or GCW over 26,001 pounds inclusive of a towed unit with a GVWR or GCW of over 10,000 pounds;
2. Heavy Straight Vehicle (Class B): Has a GVWR or GVW of more than 26,001 pounds
3. Small Vehicle (Class C): Does not meet Class A or B, but is designed to transport 16 or more passengers or, regardless of size, is used to transport hazardous materials.

c. Is the vehicle a "covered farm vehicle?"

i. Drivers of a "covered farm vehicle" are exempt, and not required to obtain a CDL if the vehicle is:

1. Registered in a State with a license plate or other designation issued by the state that allows law enforcement officials to identify it as a farm vehicle;
2. Operated by the owner or operator of a farm or ranch, or employee or family member of the farm owner;
3. Used to transport agricultural commodities, livestock, machinery, or supplies to or from a farm or ranch;
4. Not used in for-hire motor carrier operations;
5. Traveling in-state (regardless of weight) or out-of-state and have a GVWR or GVR of less than 26,001 pounds; or if GVWR or GVR of over 26,001 pounds and traveling out of state within 150 air miles of the farm or ranch.

Note: A state may also waive the required knowledge and skills test and issue restricted CDLs to employees in the following farm-related service industries:

- Agri-chemical business
- Custom harvester
- Farm retail outlet and supplier
- Livestock feeders

5. Am I required to keep paper Records of Duty Status (“RODS”)?

- a. Required for all “motor carriers,” and drivers unless an identified exception applies.
 - i. A motor carrier is anyone engaged in transportation of goods or passengers, whether for compensation, in a CMV, or both.
- b. Does an exception apply?
 - i. Covered farm vehicles (as defined above) are not required to keep RODS.
 - ii. “Short-haul operations”, as defined below, are not required to keep RODS.
 1. Driver of property-carrying commercial vehicles *for which a CDL is not required*, if:
 - a. The driver operates within a 150 air-mile radius of the location where the driver reports to and is released from work;
 - b. The driver returns to the normal work reporting location at the end of each duty tour;
 - c. The driver does not drive:
 - i. After the 14th hour after coming on duty on 5 days of any period of 7 consecutive days; and
 - ii. After the 16th hour after coming on duty on 2 days of any period of 7 consecutive days; and
 - d. The motor carrier that employs the driver maintains and retains for a period of 6 months accurate and true time records as required
 2. Driver (whether or not a CDL is required) operates within a 100 air-mile radius of the normal work reporting location;
 - a. The driver returns to the work reporting location and is released from work within 12 consecutive hours;
 - b. The driver has at least 10 consecutive hours off duty separating each 12 hours on duty;
 - c. A driver does not exceed the maximum driving time allowed in Section 395.3(a)(3) following 10 consecutive hours off duty; and
 - d. The motor carrier that employs the driver maintains and retains for a period of 6 months accurate and true time records as required
 - iii. Drivers that fall within the “agricultural operations” exemption are not required to keep RODS if:
 1. It is planting or harvest period as determined by each state;
 - a. Both Texas and Arkansas, for example, define this period to include the entire year from January 1st through December 31st.
 2. And drivers are transporting:
 - a. Ag commodities from the source of the commodity to a location within 150 air miles; or

- b. Farm supplies for ag purposes from a wholesale or retail distribution point of the farm supplies to a farm or other location where the supplies are intended to be used within a 150 air mile radius from the distribution point; or
- c. Farm supplies for agricultural purposes from a wholesale distribution point of the farm supplies to a retail distribution point of the farm supplies within a 150 air mile radius from the wholesale distribution point.
- iv. Drivers falling under the “occasional transportation” exception, discussed in Section 6 below, are exempt from keeping RODs.

6. Do I need an Electronic Logging Device, or “ELD”?

- a. ELDs are required for motor carriers operating “commercial motor vehicles” between multiple states when

- i. Your vehicle has a GCWR, GVWR, GVW, or GCW of 10,001 pounds or more;
- ii. You are traveling in “interstate commerce”; and
- iii. You are hauling property (includes horses and livestock).

- b. Are you excluded from the requirement?

- i. Vehicles older than model year 2000 are not required to have an ELD.
- ii. Drivers required to complete RODS for not more than 8 days within any 30 day period are not required to have an ELD.

Note: *Until June 18, 2018, there is a waiver excluding the transportation of “agricultural commodities” from the new electronic logging device regulations. Drivers operating under this waiver must carry a copy of it to present upon request. A copy of the waiver may be found at <https://bit.ly/2uaFCoo>.*

Further, authorities will not enforce the ELD requirement for persons hauling livestock or insects through September 30, 2018. No official waiver paperwork is necessary for this provision to apply.

Note: Drivers not required to keep RODS at all fall under this exception.

- iii. Drivers of a “covered farm vehicle” are not required to have an ELD if:
 - 1. Registered in a state with a license plate or other designation issued by the state that allows law enforcement officials to identify it as a farm vehicle;
 - 2. Operated by the owner or operator of a farm or ranch, or employee or family member of the farm owner;
 - 3. Used to transport agricultural commodities, livestock, machinery, or supplies to or from a farm or ranch;
 - 4. Not used in for-hire motor carrier operations; and
 - 5. Traveling in any state with a GVWR or GVW of less than 26,001 pounds; or if GVWR or GVW of over 26,001 pounds, traveling within the state in

which is registered or out of state within 150 air miles of the owner's farm or ranch.

- iv. Drivers engaged in the "occasional transportation of personal property" are not required to have an ELD. This exception applies if:
 - 1. The transportation is not in return for compensation; and
 - 2. It is not in the furtherance of a commercial enterprise
 - a. Any prize money is declared as ordinary income for taxes;
 - b. The cost of underlying activities is not deducted as a business expense for tax purposes;
 - c. Corporate sponsorship is not involved.

Summary

The first step is to determine whether a vehicle is being operated in "commerce" and, if so, whether that is intrastate or interstate commerce. If it is a vehicle operated in intrastate commerce, the driver should contact the appropriate state Department of Transportation. If it is operated in interstate commerce, the next step is to determine the gross combination weight rating and the gross vehicle weight rating (whichever is greater). With these initial questions answered, a driver may then continue to analyze which federal statutes apply.

A person must determine if a commercial driver's license ("CDL") is legally required. For anyone operating in commerce with a weight rating or actual weight of more than 26,001, a CDL is required, unless the vehicle qualifies as a covered farm vehicle.

Next, a person must analyze whether installing an electronic logging device ("ELD") is required. ELDs are required for any vehicle hauling property weighing over 10,001 pounds that does not fall under exceptions such as the covered farm vehicle, occasional transportation, or other listed exceptions. As part of analyzing the ELD requirements, a person should consider whether he or she is required to keep paper records of duty status (RODS.)

Many livestock owners will fall under an exception to the rules, such as the covered farm vehicle exemption or an exemption for drivers not required to maintain certain records more than 8 out of a 30 day period. There may be concern, however, for persons with vehicles over 26,001 pounds, who travel more than 8 days out of a 30 day period, who are traveling more than 150 miles out of state.

For example, a rodeo athlete living in San Antonio who is going to travel to Oklahoma City to compete in a rodeo may have to have a CDL, ELD, and be required to keep RODS. The "covered farm vehicle" exception to the CDL requirement would not apply as the athlete would be traveling out of state and more than 150 miles. Thus, a CDL would be required. The "covered farm vehicle" exception to the ELD requirement would not apply for the same reasons. Further, the occasional transportation exception likely would not apply because most athletes in this situation would deduct underlying expenses from taxes and many may have corporate sponsorships. Thus, the only potential exception left would be if the person was not required to keep paper records of duty status "RODS" for more than 8 days during a 30

day period. This would likely depend on how many trips the driver had taken, and where the trip destinations were, within the last month.

Livestock exhibitors would be another example. Assume a person in Amarillo has a vehicle with a GCWR or GVWR over 26,001 pounds headed to a stock show to exhibit cattle. The driver would need to determine if he was traveling in “commerce.” If the livestock owner was a ranch and the stock were to be exhibited in an open show as part of the ranch business, that likely would constitute commerce and the federal regulations would be applicable. If, however, the livestock were owned by a 4-H or FFA exhibitor and were not part of an underlying business, the hauling would likely not constitute “commerce” and the federal regulations would not apply.

Assuming a factual scenario where the hauling did constitute commerce, if the exhibitor hauls to Houston, he or she would not be required to have a CDL if the farm vehicle exception applies (farm tags are required on the vehicle) because the travel would be in-state. If the same vehicle was headed to show at Denver, a CDL would be required because that would be out-of-state and more than 150 miles. With regard to an ELD and hours of service requirements, there are likely several exceptions that would apply, including the covered farm vehicle exception, the “occasional transportation exception”, or the 8/30 day exception if the driver was not required to keep paper RODS more than 8 out of a 30 day period.

Conclusion

As with most regulations, the FMCSA rules are complicated and determining applicability can be very fact specific. An additional layer of complication exists with regard to state Department of Transportation rules, which may differ from the federal rules discussed in this outline. Anyone concerned should visit with an attorney, Department of Transportation employee, or FMCSA official to determine what, if any, of these rules may apply to their situation.



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Beef Checkoff Dollars & USDA “Redirection”: Compatible with Federal Law?

Harrison Pittman

Director, National Agricultural Law Center

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INTRODUCTION

Congress enacted the Beef Promotion and Research Act of 1985¹ (Beef Act) to authorize “a coordinated program of promotion and research designed to strengthen the beef industry’s position in the marketplace and to maintain and expand domestic and foreign markets and uses for beef and beef products.”² This program, commonly referred to as the beef checkoff, is funded by a mandatory assessment of one dollar per-head of cattle sold in the United States.³ Additionally, the Beef Act and Beef Promotion and Research Order⁴ (Order) set forth a mandatory three-step process for the payment, collection, and remittance of the assessment that, when complied with, results in a state’s Qualified State Beef Council⁵ (QSBC) retaining one-half of the assessment and remitting the remaining half to the Cattlemen’s Beef Promotion and Research Board (Board).⁶

However, the USDA Agricultural Marketing Service (AMS) implements a “redirection” policy that appears incompatible with the Beef Act and Order, specifically including the three-step process that governs the payment, collection, and remittance of the dollar per-head assessment.⁷ The policy at issue allows beef producers in certain states to “redirect” the full dollar per-head assessment to the Board, thereby prohibiting the QSBC from retaining the fifty cents of the assessment it would have otherwise retained. More recently, AMS issued a proposed rule that “is intended to formalize the policy.”⁸ Outside of redirection, there appears to be no other legal avenue under the Beef Act or Order that allows QSBCs to be “bypassed” such that the assessment they would have collected, retained, and expended is otherwise remitted to the Board. Thus, redirection is very significant because it directly impacts – and challenges – the federal-state relationship Congress envisioned when it enacted the Beef Act more than three decades ago.

The apparent incompatibility between “redirection” and the Beef Act and Order raises questions as to whether, or to what extent, redirection is legally permissible. Additionally, there is a central question as to

¹ 7 U.S.C. §§ 2901-2911 (2012).

² *Id.* at § 2901(b).

³ *Id.* at § 2904(8)(C). The Beef Act requires importers to pay the one dollar per-head assessment “or the equivalent thereof.” *Id.*

⁴ 7 C.F.R. Part 1260.

⁵ See 7 U.S.C. § 2902(14) and 7 C.F.R. § 1260.115 (defining “Qualified State Beef Council”). See also 7 C.F.R. § 1260.181 (setting forth requirements for certification as a Qualified State Beef Council).

⁶ See *Flow of a Checkoff Dollar*, CATTLEMEN’S BEEF PROMOTION AND RESEARCH BOARD, <http://www.beefboard.org/> (follow “Resources +” tab; then follow “Flow of a Checkoff Dollar” hyperlink under “References”).

⁷ Soybean Promotion, Research, and Consumer Information; Beef Promotion and Research; Amendments to Allow Redirection of State Assessments to the National Program; Technical Amendments; 81 Fed. Reg. 45984, 45986 (proposed July 15, 2016) (to be codified at 7 C.F.R. pt. 1220 and 1260) (hereinafter Redirection Proposed Rule). See also Defendants’ Objections to Findings and Recommendations of United States Magistrate Judge at 7-8, *Ranchers-Cattlemen Action Legal Defense Fund, United Stockgrowers of America v. United States Department of Agriculture*, 4:16-cv-00041-BMM, Doc. 45 (D. Mont., Dec. 23, 2016) (“Defendants have now made clear that, in accordance with USDA’s longstanding policy, cattle producers in states like Montana may decline to contribute to a QSBC and instead direct the QSBC to forward the full amount of their federal assessment to the Beef Board.”).

⁸ Redirection Proposed Rule at 45986 (“In States where payments to a QSBC are not required by State law, the opportunity for producers to choose to direct the full assessment is already AMS’ current policy; this rule is intended to formalize the policy.”).

whether AMS's stated legal basis for its redirection policy is based on an accurate interpretation of the Beef Act and Order. This article briefly addresses these questions.

A. *Beef Act & Order: Three-Step Process*

The Beef Act and Order establish a mandatory three-step process for the payment, collection, and remittance of the dollar per-head assessment that fuels the beef checkoff at the state and national levels. That process is as follows:

- (1) The purchaser "shall" collect the dollar per-head assessment from the producer;⁹
- (2) The purchaser "shall" remit to the appropriate QSBC the dollar per-head assessment it collected from the producer;¹⁰ and
- (3) The QSBC "shall remit to the Board assessments paid and remitted to the council, *minus authorized credits issued to producers pursuant to § 1260.172(a)(3) . . .*"¹¹

Additionally, if a purchaser fails to collect the assessment from the producer, that failure "shall not relieve the producer of his obligation to pay the assessment to the appropriate qualified State beef council . . ." ¹² A producer, purchaser, or QSBC that fails to comply with these requirements stands in violation of the Beef Act and Order.¹³

Section 1260.172(a)(3) provides that "a producer who is contributing to a qualified State beef council(s) shall receive a credit from the Board for contributions to such council, but not to exceed 50 cents per head of cattle produced."¹⁴ The practical application of the § 1260.172(a)(3) is that QSBCs retain fifty cents of the dollar per-

⁹ 7 U.S.C. § 2904(8)(A) ("The order shall provide that each person making payment to a producer for cattle purchased from the producer shall, in the manner prescribed in the order, collect an assessment . . ."); 7 C.F.R. §§ 1260.172(a)(1) (" . . . each person making payment to a producer for cattle purchased from such producer . . . shall collect an assessment from the producer, and each producer shall pay such assessment . . ."); and 7 C.F.R. § 1260.311(a) (" . . . each person making payment to a producer for cattle purchased . . . shall collect from the producer an assessment at the rate of \$1-per-head of cattle. . .").

¹⁰ 7 U.S.C. § 2904(8)(A); *id.* at § 2904(8)(B) ("If an appropriate qualified State beef council does not exist to collect an assessment in accordance with paragraph(1), such assessment shall be collected by the Board."); 7 C.F.R. § 1260.172(a)(1) (" . . . such collecting person shall remit the assessment to the Board or to a qualified State beef council pursuant to § 1260.172(a)(5)."); 7 C.F.R. § 1260.172(a)(5) ("Each person responsible for the remittance of the assessment pursuant to § 1260.172(a)(1) and (2) shall remit the assessment to the qualified State beef council in the State from which the cattle originated prior to sale, or if there is no qualified State beef council within such State, the assessment shall be remitted directly to the Board."); 7 C.F.R. § 1260.311(a) (" . . . each person making payment . . . shall collect . . . an assessment . . . and shall be responsible for remitting assessments to the QSBC or Board as provided in § 1260.312."); 7 C.F.R. § 1260.311 ("Each person responsible for the collection and remittance of assessments shall transmit assessments . . . to the qualified State beef council of the State in which such person resides or if there is not qualified State beef council in such State, then to the Cattlemen's Board as follows . . ."). *See also* 7 C.F.R. § 1260.310(c) ("Failure of the collecting person to collect the assessment on each head of cattle . . . shall not relieve the producer of his obligation to pay the assessment to the appropriate qualified State beef council or the Cattlemen's Board as required in § 1260.312.").

¹¹ 7 U.S.C. § 2904(8)(A); 7 C.F.R. § 1260.181(b)(4) (emphasis added).

¹² 7 C.F.R. § 1260.310(c).

¹³ *See* 7 U.S.C. § 2908 (Enforcement). *See also id.* at § 2904(2)E).

¹⁴ 7 C.F.R. § 1260.172(a)(3).

head assessment so that the QSBC can “determine how it should be invested in local and state programs.”¹⁵ It bears noting that the requirement that the QSBC remit fifty cents to the Board and retain fifty cents is one that a state entity “must” agree to in order to even exist as a QSBC.¹⁶

B. *AMS Redirection Policy & Proposed Rule: An Overview*

AMS states that it maintains a “longstanding policy” that allows producers “to decline to contribute to a QSBC and instead direct the QSBC to forward the full amount of their federal assessment to the Beef Board.”¹⁷ The redirection policy applies whenever “there is no state law requiring cattle producers to contribute to the QSBC.”¹⁸ On July 15, 2016, AMS issued a proposed rule that is “intended to formalize the policy.”¹⁹

AMS’s proposed rule encompasses its “longstanding policy” of redirection but also includes a standard that deals with the existence of producer refund provisions “authorized or required” under state law. According to the AMS Press Release that accompanied the issuance of the proposed rule, the rule would apply when (1) “there is no state law requiring assessments to a state . . . council”; or (2) “there is a state law requiring assessments, but the state law allows for refunds.”²⁰

C. *Redirection: Legally Permissible?*

1) AMS’s Core Legal Basis for Redirection May Be In Fundamental Error

AMS’s core legal basis for its “longstanding policy” of redirection appears to be based on an interpretation of the Beef Act and Order that may be precisely the opposite of the meaning given by the plain language of the Beef Act and Order. If true, AMS’s stated legal basis for redirection would be in serious error. Similarly, the portion of the proposed rule that applies when “there is no state law requiring assessments to a state . . . council” would stand in equal legal jeopardy.

In explaining its redirection policy, AMS states the following:

Furthermore, while the Beef Act and Beef Order *authorize* QSBCs to retain up to 50 cents per head of cattle assessed, neither the Beef Act or the Beef Order *require* producers to contribute a portion of the \$1.00-per-head assessment to a QSBC. Thus, unless State statutes require the collection of the \$1.00-per-head assessment set forth in the Beef Act (the federal assessment) or require producers to contribute a portion of the \$1.00-per-head assessment to the State

¹⁵ *Flow of a Checkoff Dollar*, CATTLEMEN’S BEEF PROMOTION AND RESEARCH BOARD, <http://www.beefboard.org/> (follow “Resources +” tab; then follow “Flow of a Checkoff Dollar” hyperlink under “References”).

¹⁶ 7 C.F.R. § 1260.181.

¹⁷ Defendants’ Objections to Findings and Recommendations of United States Magistrate Judge at 7-8, *Ranchers-Cattlemen Action Legal Defense Fund, United Stockgrowers of America v. United States Department of Agriculture*, 4:16-cv-00041-BMM, Doc. 45 (D. Mont., Dec. 23, 2016). *See also* Proposed Redirection Rule at 45986.

¹⁸ *Id.* at 12-13 (citing Proposed Redirection Rule at 45986).

¹⁹ Proposed Redirection Rule at 45986).

²⁰ Press Release, Sam Jones-Ellard, *USDA Proposes Changes to Beef and Soybean Checkoff Programs*, UNITED STATES DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE (July 15, 2016, 9:30 AM), <https://www.ams.usda.gov/press-release/usda-proposes-changes-beef-and-soybean-checkoff-programs>.

beef council, producers may be able to choose not to contribute up to 50 cents per head of the federal assessment to their QSBC.²¹

Here, AMS clearly espouses that the legal foundation of its “longstanding policy” of redirection is predicated upon an interpretation that the Beef Act and Order merely “authorize” – rather than “require” – QSBCs to retain fifty cents per head of cattle assessed. However, as previously detailed, the mandatory three-step process set forth in the Beef Act and Order, when complied with, concludes with the QSBC retaining fifty cents of the assessment and remitting fifty cents to the Board. Thus, it may be that AMS’s entire legal foundation for redirection has no basis in law because its interpretation is precisely the opposite of the meaning given to the plain language of the Beef Act and Order.

Additionally, AMS’s view that “neither the Beef Act or the Beef Order require producers to contribute *a portion* of the \$1.00-per-head assessment to a QSBC”²² may be expressly contradicted by the Beef Act and Order. Specifically, “[f]ailure of the collecting person to collect the assessment . . . shall not relieve the producer of his obligation to pay the assessment to the appropriate qualified State beef council or Cattlemen’s Board as required in §1260.312.”²³ The Beef Act and Order require that such payment be made to the QSBC if one exists in that state; the assessment is to be made directly to the Board only if there is no QSBC.²⁴ Finally, the Beef Act and Order actually characterize such payments to QSBCs – as well as those payments that are remitted to QSBCs when the purchaser does *not* fail to collect the assessment – as “*contributions* to such Council.”

AMS asserts that “[t]hus, unless State statutes require *the collection* of the \$1.00-per-head assessment set forth in the Beef Act . . . to the State beef council, . . . producers may be able to choose not to contribute up to 50 cents per head of the federal assessment to their QSBC.”²⁵ The Beef Act expressly speaks to this precise issue, which presumably negates the legal relevance of a standard that depends upon the existence of state laws that “require the collection of the \$1.00-per-head assessment”. Specifically, the Beef Act states as follows: “The Board *shall* use qualified State beef councils *to collect* such assessments.”²⁶ Therefore, this particular basis for redirection appears to be expressly prohibited by the plain language of the Beef Act and Order.

Next, AMS asserts that “[t]hus, unless State statutes require . . . producers to contribute *a portion* of the \$1.00-per-head assessment to the State beef council, producers may be able to choose not to contribute up to 50 cents per head of the federal assessment to their QSBC.”²⁷ As noted, the Beef Act and Order require producers to pay the dollar per-head assessment to the purchaser at the point of sale or, in the event the purchaser fails to collect the assessment, directly to the appropriate QSBC. Once the assessment is remitted to and collected by the QSBC, the fate of the assessment is governed not by the producer or state law. Rather, the fate of the assessment is governed by the Beef Act and Order requirement that the QSBC “*shall* remit to

²¹ Proposed Redirection Rule at 45986 (emphasis added).

²² *Id.* (emphasis added).

²³ 7 C.F.R. § 1260.310(c).

²⁴ 7 U.S.C. § 2904(8)(A); 7 C.F.R. § 1260.312.

²⁵ Proposed Redirection Rule at 45986 (emphasis added).

²⁶ 7 U.S.C. § 2904(8)(A) (emphasis added).

²⁷ Proposed Redirection Rule at 45986 (emphasis added).

the Board assessments paid and remitted to the council, *minus authorized credits issued to producers pursuant to § 1260.172(a)(3).*²⁸

Finally, it bears re-emphasizing that even if AMS's legal basis for redirection is not in error, its reliance on the existence or non-existence of state law requiring assessments to a QSBC remains legally problematic. The Beef Act and the Order – not state law – clearly establish the mandatory three-step process that, when complied with, concludes with the QSBC retaining one-half of the dollar per-head assessment. That mandatory process in no way involves or is otherwise influenced by the existence of a state law. Therefore, AMS's reliance on the existence of state laws that alter the mandatory requirements of the Beef Act and Order appears to be a false standard that falls outside the boundaries prescribed by the Beef Act and Order, even if AMS's legal basis for redirection is somehow based on a proper interpretation of the Beef Act and Order.

2) Preemption or Superseding of States' Producer Refund Provisions

Another key issue regarding redirection is whether states' producer refund provisions are preempted or superseded by the Beef Act and Order. If states' refund provisions are preempted or superseded by federal law, then those state laws are unenforceable or otherwise set aside. Thus, the state law would not be available for a producer to even request the refund that then triggers "redirection". If true, the portion of AMS's redirection policy and proposed rule that applies to QSBCs that are "authorized or required" to provide producer refunds may not even be capable of implementation. Conversely, if states' refund provisions are somehow not preempted or superseded by state law, the question arises as to how a producer's request for a refund under an otherwise valid and operable state law simultaneously results in the producer's loss of a refund *and* the QSBC's loss of funds that the QSBC would have otherwise retained in accordance with the mandatory, three-step process for the payment, collection, and remittance of the full assessment.

CONCLUSION

Redirection is a very unique legal concept that directly impacts the "coordinated" federal-state relationship Congress established when it enacted the Beef Act thirty-two years ago. As such, it warrants scrutiny from any person or entity who pays, collects, expends, or is otherwise impacted by the beef checkoff.

The uniqueness of redirection is amplified when one considers that redirection appears to be the only mechanism in the Beef Act and Order – or USDA policy based on interpretation of the Beef Act and Order – through which assessment funds that would otherwise be collected, retained, and expended by QSBCs are instead collected, retained, and expended by the Board. Stated differently, USDA's "longstanding policy" of redirection appears to be the only way in which a QSBC is deprived of the funding it would otherwise collect and retain as a result of producers', purchasers', and QSBCs' compliance with the mandatory three-step process set forth in the Beef Act and Order. Redirection therefore strikes at the very heart of the federal-state relationship Congress wove into the beef checkoff in 1985.

Yet, the term "redirection" is never defined, discussed, or otherwise mentioned in the Beef Act or Order. Currently, redirection exists only as a policy that is born entirely from AMS's interpretation that "neither the Beef Act or Order require producers to contribute a portion of the \$1.00-per-head assessment to a QSBC." As discussed in this brief article, AMS's interpretation may be exactly the opposite of what Congress – and AMS itself – envisioned when beef checkoff launched more than three decades ago. Further, AMS's reliance on the existence or non-existence of state law may be based not only on a faulty interpretation of the Beef Act and

²⁸ 7 C.F.R. § 1260.181(b)(4) (emphasis added).

Order but also be expressly contradicted by the plain language of the Beef Act and Order. The proposed rule, which incorporates AMS's existing policy as well as a standard that depends on the existence of states' producer refund provisions, may also be legally problematic.

Ironically, redirection requires QSBCs to violate § 1260.181(b)(4) of the Beef Order, one of several criteria state entities "must" agree to comply with in order to even exist as a QSBC. Namely, § 1260.181(b)(4) requires that the state entities that applied to the Board for certification as a QSBC "must" agree that it "shall remit to the Board assessments paid and remitted to the Council, minus authorized credits issued to producers pursuant to § 1260.172(a)(3)." Like redirection itself, § 1260.181(b)(4) strikes at the heart of the federal-state relationship that Congress constructed under the Beef Act. Yet, § 1260.181(b)(4) is effectively suspended in each instance that redirection applies; namely, when (1) "there is no state law requiring assessments to a state . . . council"; or (2) "there is a state law requiring assessments, but the state law allows for refunds."²⁹

What's a QSBC to do when it receives a producer's request for redirection or for a refund "authorized or required" under state law? Should the QSBC comply with the mandatory requirements placed upon it by the Beef Act and Order, or comply with AMS's policy of redirection based the agency's interpretation of the Beef Act and Order? The lack of compatibility between redirection and the Beef Act and Order suggests that it is not possible for a QSBC to simultaneously comply with both, thereby setting the stage for legal and political tension between cattle producers, QSBCs, the Board, and USDA that could undermine the vitality of the beef checkoff.³⁰

²⁹ Press Release, Sam Jones-Ellard, *USDA Proposes Changes to Beef and Soybean Checkoff Programs*, UNITED STATES DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE (July 15, 2016, 9:30 AM), <https://www.ams.usda.gov/press-release/usda-proposes-changes-beef-and-soybean-checkoff-programs>.

³⁰ Chris Bennett, *Legal Jumble Over Beef, Soybean Checkoff Articles?* AGWEB (POWERED BY FARM JOURNAL), Nov. 6, 2016, available at <https://www.agweb.com/article/legal-jumble-over-beef-soybean-checkoff-dollars-naa-chris-bennett/>.



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Summary

The farm bill provides an opportunity for Congress to address agricultural and food issues comprehensively about every five years. Over time, farm bills have tended to become more complicated and politically sensitive. As a result, the timeline for reauthorization has become less certain, and in general recent farm bills have taken longer to enact than in previous decades. Recent farm bills, beginning with the 2008 farm bill (P.L. 110-246), have been subject to various developments that have delayed enactment, such as insufficient votes to pass the House floor, presidential vetoes, and short-term extensions.

The 2014 farm bill took more than 21 months from introduction to enactment and spanned the 112th and 113th Congresses. The House rejected a bill in 2013 and then passed separate farm and nutrition assistance components before procedurally recombining them for conference with the Senate. Somewhat similarly, the 2008 farm bill took more than a year to enact and was complicated by revenue provisions from another committee of jurisdiction, temporary extensions, and vetoes.

Whether the House or Senate proceeds first in committee or on the floor is also not always predictable. Both the 2008 farm bill and the 2002 farm bill were extended before their successors were enacted.

In 2018, a farm bill reauthorization was reported from the House Agriculture Committee on April 18 (H.R. 2). An initial floor vote on passage on May 18 failed in the House 198-213, but floor procedures allowed that vote to be reconsidered (H.Res. 905). The House passed H.R. 2 in a second vote of 213-211 on June 21, 2018. In the Senate, the Agriculture Committee reported its bill (S. 3042) on June 13 by a vote of 20-1. The Senate passed its bill as an amendment to H.R. 2 by a vote of 86-11 on June 28, 2018.

This report examines the major legislative milestones for the last 11 farm bills covering 53 years and illustrates trends that may provide useful background and context as the current farm bill debate proceeds.

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The farm bill provides an opportunity for Congress to address agricultural and food issues comprehensively about every five years.¹ Over time, farm bills have tended to become more complicated and politically sensitive. This has made the timeline for reauthorization less certain. Recent farm bills have been subject to developments that have delayed enactment, such as insufficient votes to pass the House floor, presidential vetoes, and short-term extensions.

For example, the 1973 farm bill was enacted less than three months after being introduced. In contrast, the 2014 farm bill took more than 21 months from introduction to enactment, spanning the 112th and 113th Congresses.² The House rejected a bill in 2013 and then passed separate farm and nutrition assistance components—the first time a chamber-passed farm bill reauthorization did not include a nutrition title since nutrition became part of the farm bill in 1973. The House later procedurally recombined them for conference with the Senate.

Both the 2002 and 2008 farm bills had expired for about three months (from October through December in 2007 and 2012) before extensions were enacted. In each case, the fiscal year began under a continuing resolution for appropriations. The extensions of the 2002 farm bill were for relatively short periods totaling about five months during final House-Senate negotiations. However, the extension of the 2008 farm bill in 2013 was for a full year, since the 112th Congress had ended and it was necessary to reintroduce farm bill legislation in the 113th Congress.

In 2018, a farm bill reauthorization was reported from the House Agriculture Committee on April 18 (H.R. 2). An initial floor vote on passage on May 18 failed in the House 198-213, but procedures allowed that vote to be reconsidered (H.Res. 905). The House passed H.R. 2 in a second vote of 213-211 on June 21, 2018. In the Senate, the Agriculture Committee reported its bill (S. 3042) on June 13 by a vote of 20-1. The Senate passed its bill as an amendment to H.R. 2 by a vote of 86-11 on June 28, 2018. This is the first time since at least 1965 that both chambers completed floor action before the end of June.

This report examines the major legislative milestones for the last 11 farm bills over 53 years, a period representing modern farm bills with growing complexity. It discusses trends that may provide historical perspective as the current farm bill debate proceeds. **Table 1** contains a history of major legislative action on farm bills since 1965. **Figure 1** shows the dates on a timeline for each farm bill from introduction to enactment. The consequences of expiration of a farm bill,³ as well as its content, are discussed in other CRS reports.⁴

Timelines for Enactment, Extension, and Vetoes

Parts of a farm bill are authorized for a period of fiscal years and therefore expire at the end of the fiscal year (September 30) in the year of the farm bill's expiration. Other parts are authorized for crop years or calendar years. The 2014 farm bill (the Agricultural Act of 2014, P.L. 113-79) generally expires at the end of FY2018 and with the 2018 crop year, which for dairy is the end of the calendar year.

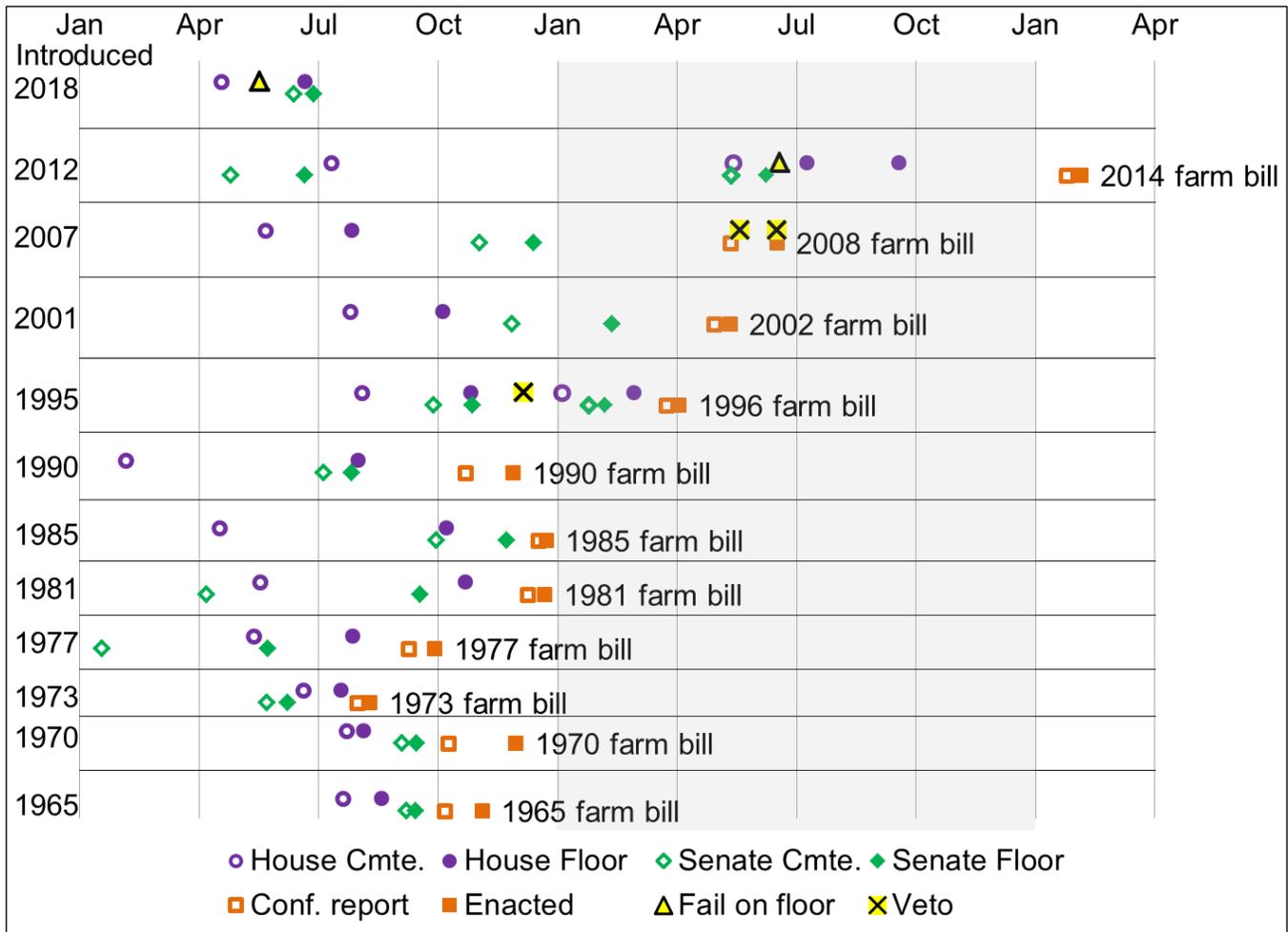
¹ See CRS In Focus IF10187, *Farm Bill Primer: What Is the Farm Bill?*

² These dates span only the official introduction of a bill marked up by committee until the President signed the bill. They do not include background hearings before committee markup, which would extend the timeline.

³ For example, expiration of the 2008 farm bill as the 2014 farm bill was being developed is discussed in CRS Report R42442, *Expiration and Extension of the 2008 Farm Bill*.

⁴ See CRS Report R45197, *The House Agriculture Committee's 2018 Farm Bill (H.R. 2): A Side-by-Side Comparison with Current Law*; and CRS Report R44913, *Farm Bill Primer Series: A Guide to Omnibus Legislation on Agriculture and Food Programs*.

Figure I. Major Legislative Actions on Farm Bills, 2018-1965



Source: CRS, using <http://www.congress.gov>.

Timeline Relative to Fiscal Years

Enacting farm bills after the end of the fiscal year (in which a farm bill expired) is commonplace. In the past 53 years, only the 1973 and 1977 farm bills were enacted before the September 30 expiration date for most programs.

Timeline Relative to Calendar Years

Farm bills in 1965, 1970, 1981, 1985, and 1990 were enacted by December 31—within three months of the end of the fiscal year but before spring-planted crops that would be covered by the new law were planted. The most recent four farm bills (1996, 2002, 2008, and 2014) have been enacted later in the year—in April (1996), May (2002), June (2008), and February (2014)—but still prior to the first crop covered by the farm bill was harvested.

Timeline Relative to the Two-Year Congress

Since 1965, eight out of 11 enacted farm bills were *introduced* in the first session of a two-year Congress (the odd-numbered year); the exceptions are the 1970, 1990, and 2014 farm bills.⁵ The 2014 farm bill, which was introduced in 2012, was the first to start in one Congress, remain unfinished, and require reintroduction in a subsequent Congress. *Enactment* of the past five farm bills (1990-2014) have been in the second session (the even-numbered year), although, except for the 1990 farm bill, some action had occurred in the prior year. Only the 1970 and 1990 farm bills were enacted after an election during a lame duck Congress in late November.

House or Senate Action First

The House and Senate have taken turns in initiating action on a farm bill. Since 1965, the Senate was first to mark up farm bills in 1973, 1977, 1981, 2012, and 2013. The House was first to mark up bills in 1965, 1970, 1985, 1990, 1995 (and 1996), 2001, 2007, and 2018.

Short-Term Extensions

Extensions of a prior farm bill while its successor is being written have been atypical, though the past two reauthorizations have involved extensions. Only the 2002 and 2008 farm bills have required extensions in 2007-2008 and 2013, respectively, as their successors were being written.⁶

When the 2002 farm bill expired, portions of it were extended six times for less than a year total beginning in December 2007. The first of those extensions continued authority for many expiring programs for about three months.⁷ Because final agreement was pending, five more extensions—ranging from a week to a month—were needed. With a few exceptions, these extensions continued all 2002 farm bill provisions that were in effect on September 30, 2007. Dairy and sugar programs were included, as were price support loan programs for wool and mohair. But the direct, counter-cyclical, and marketing loan programs for the 2008 crop year for all other supported commodities (i.e., the primary supported commodities such as feed grains, oilseeds, wheat, rice, cotton, and peanuts) were specifically *not* extended.⁸ Moreover, the first extension in December 2007 did not address permanent law, but the second and subsequent extensions in 2008 did extend the 2002 farm bill's suspension of permanent law.⁹

⁵ Technically, the bill that became the 2014 farm bill (H.R. 2642) was introduced in 2013 (the first session of the 113th Congress), but many observers consider it a reintroduction of the bills started in 2012.

⁶ The 1965 farm bill was extended for one year, but that extension occurred more than a year before expiration and before the reauthorization process had begun in 1970. The 1996 and 2002 farm bills may appear to have been delayed by being reintroduced (1996) or going through the new year into May (2002), but their predecessors did not require extensions. Writing the 1996 farm bill was not pressured by the 1990 farm bill's original expiration date of the 1995 crop year because budget reconciliation in 1993 had extended the farm commodity programs through at least 1996 and, in some cases, the 1997 crops. Writing the 2002 farm bill was not pressured because the 1996 farm bill was to be effective until September 30, 2002, and through the 2002 crop year. In fact, the 2002 farm bill superseded the last year of the 1996 farm bill by beginning with the 2002 crop year.

⁷ "Except as otherwise provided in this Act ... authorities provided under the Farm Security and Rural Investment Act of 2002 ... (and for mandatory programs at such funding levels), as in effect on September 30, 2007, shall continue, and the Secretary of Agriculture shall carry out the authorities, until March 15, 2008." P.L. 110-161, §751.

⁸ Other programs that were *not* included in the extensions were peanut storage payments, agricultural management assistance, community food projects, the rural broadband program, value-added market development grants, federal procurement of biobased products, the biodiesel fuel education program, and the renewable energy systems program.

⁹ Permanent law refers to nonexpiring provisions in Agriculture Adjustment Act of 1938 and the Agriculture Act of (continued...)

When the 2008 farm bill expired on September 30, 2012, the continuing resolution providing appropriations (P.L. 112-175, §§101, 111) continued discretionary programs, the Supplemental Nutrition Assistance Program (SNAP), and certain related nutrition programs. Certain other mandatory programs—such as the Market Assistance Program and the Conservation Reserve Program—ceased to operate insofar as new activity.¹⁰ On January 2, 2013, the entire 2008 farm bill, as it existed on September 30, 2012, was extended for the 2013 fiscal year and the 2013 crop year (P.L. 112-240). This avoided reverting to permanent law for the farm commodity programs, which was imminent for the dairy programs.

The situation from October to December 2013 somewhat repeated the end of 2012. Most of the discretionary parts of the farm bill expired again on October 1, 2013. Some programs ceased new operations, while others were able to continue under appropriations. For SNAP and the discretionary programs, farm bill expiration coupled with the two-week lapse during October 2013 of FY2014 appropriations (the “government shutdown”) did create difficulties in operating some farm bill programs. From January 1, 2014, until enactment of the 2014 farm bill on February 7, 2014, the dairy program had technically reverted to permanent law, though federal officials did not implement it, since a conference agreement was imminent.

Presidential Vetoes

Presidential vetoes of farm bills are not common. Since 1965, only the 2008 farm bill has been vetoed as stand-alone measure; it was vetoed twice. A 1995 farm bill was vetoed as part of a larger budget reconciliation package.¹¹

President George W. Bush vetoed the 2008 farm bill (H.R. 2419). When Congress overrode the veto to enact P.L. 110-234, it accidentally enrolled the law without Title III (the trade title). Congress immediately reintroduced the same bill with the trade title (H.R. 6124). President Bush vetoed this version as well, and Congress again overrode the veto to enact P.L. 110-246, a complete 2008 farm bill that included the trade title. The overrides in 2008 were the only time that a farm bill was enacted as a result of a veto override.

President Clinton vetoed a 1995 budget reconciliation package that included the first version of what became the 1996 farm bill, but the veto was not due to the farm bill itself but rather the controversial nature of the reconciliation bill in which the farm bill was embedded.

Implications for Congress

As farm bill reauthorization has tended to become more complex and engender greater political sensitivity, the process of enacting a new farm bill prior to the expiration of the existing law has become more difficult. As stakeholders in the farm bill have become more diverse, more people are affected by the legislative uncertainty around this process. This lack of certainty may translate into questions about the availability of future program benefits, some of which may affect agricultural production decisions or market uncertainty for agricultural commodities.

(...continued)

1949 that are temporarily suspended by each modern farm bill. The commodity support provisions of permanent law are inconsistent with today’s farming, marketing, and trade agreements and potentially costly to the federal government. See CRS Report RL34154, *Possible Expiration (or Extension) of the 2002 Farm Bill*.

¹⁰ See CRS Report R42442, *Expiration and Extension of the 2008 Farm Bill*.

¹¹ Prior to 1965, the first veto of a farm bill was in 1956, when President Eisenhower vetoed H.R. 12, the first version of the Agricultural Act of 1956.

Table I. Major Legislative Actions on Farm Bills, 2018-1965

| | House Cmte. | House Passage | Senate Cmte. | Senate Passage | Conference Report Approval | | | Public Law |
|---|--|---|--|---------------------------------------|------------------------------|---|--|---------------------------------------|
| | | | | | Conf. Report | House Passage | Senate Passage | |
| 2018 farm bill (115 th Congress) Agriculture and Nutrition Act of 2018 Would cover 2019-2023 crops or until 9/30/2023 | 4/18/2018 H.R. 2 Vote of 26-20 5/3/2018 H.Rept. 115-661 | 5/18/2018 H.R. 2 Initial vote failed by 198-213 Reconsider under H.Res. 905 6/21/2018 Passed by vote of 213-211 | 6/13/2018 S. 3042 Vote of 20-1 | 6/28/2018 H.R. 2 Vote of 86-11 | — | — | — | — |
| Agricultural Act of 2014 (113 th Congress) Covers 2014-2018 crops or until 9/30/2018 | 5/15/2013 H.R. 1947 Vote of 36-10 5/29/2013 H.Rept. 113-92 | 6/20/2013 H.R. 1947 Failed by 195-234 7/11/2013 H.R. 2642 Farm part vote of 216-208 9/19/2013 H.R. 3102 Nutrition part vote of 217-210 9/28/2013 H.Res. 361 combines House bills | 5/14/2013 S. 954 Vote of 15-5 9/4/2013 S.Rept. 113-88 | 6/10/2013 S. 954 Vote of 66-27 | 1/27/2014 H.Rept. 113-333 | 1/29/2014 H.R. 2642 Vote of 251-166 | 2/4/2014 H.R. 2642 Vote of 68-32 | 2/7/2014 P.L. 113-79 |
| Agriculture Reform, Food, and Jobs Act (112 th Congress) | 7/11/2012 H.R. 6083 Vote of 35-11 9/13/2012 H.Rept. 112-669 | — | 4/26/2012 S. 3240 Vote of 16-5 8/28/2012 S.Rept. 112-203 | 6/21/2012 S. 3240 Vote of 64-35 | — | — | — | — |
| Early extension: | Extended five conservation programs of the 2008 farm bill through FY2014 (AMA, CSP, EQIP, FPP, and WHIP). | | | | | | | 11/18/2011 P.L. 112-55 |
| Extension: | One-year extension of the 2008 farm bill until 9/30/2013 and for the 2013 crop year (dairy price support extended until 12/31/2013, and MILC extended until 9/30/2013). Did not provide funding for programs without mandatory baseline. | | | | | | | 1/2/2013 P.L. 112-240 Title VII |

| | Conference Report Approval | | | | | | | Public Law |
|---|--|-----------------|-----------------|--------------------|------------------------------------|--------------------------|------------------------|---------------------------------|
| | House Cmte. | House Passage | Senate Cmte. | Senate Passage | Conf. Report | House Passage | Senate Passage | |
| 2008 farm bill | 5/22/2007 | 7/27/2007 | 11/2/2007 | 12/14/2007 | 5/13/2008 | 5/14/2008 | 5/15/2008 | 5/21/2008 |
| Food, Conservation, and Energy Act of 2008 | H.R. 2419 | H.R. 2419 | S. 2302 | Amdt. to H.R. 2419 | H.Rept. 110-627 | H.R. 2419 | H.R. 2419 | Enrolling error omits Title III |
| Covers 2008-2012 crops or until 9/30/2012 | Introduced 7/23/2007 | Vote of 231-191 | S.Rept. 110-220 | Vote of 79-14 | | Vote of 318-106 | Vote of 81-15 | Vetoed |
| | H.Rept. 110-256 | | | | | | | |
| | | | | | | 5/21/2008 | 5/22/2008 | 5/22/2008 |
| | | | | | | Passed over veto 316-108 | Passed over veto 82-13 | P.L. 110-234 |
| | | | | | Re-passed as new bill w/ Title III | 5/22/2008 | 6/5/2008 | 6/18/2008 |
| | | | | | | H.R. 6124 | H.R. 6124 | Vetoed |
| | | | | | | Vote of 306-110 | Vote of 77-15 | |
| | | | | | | 6/18/2008 | 6/18/2008 | 6/18/2008 |
| | | | | | | Passed over veto 317-109 | Passed over veto 80-14 | P.L. 110-246 |
| Early extensions: | Extended the early-expiring MILC program of the 2002 farm bill for two years from 9/2005 through 8/2007 and two conservation programs (EQIP and Conservation Security Program) until FY2010. | | | | | | | 2/8/2006 |
| | | | | | | | | P.L. 109-171 |
| Extensions: | Extended parts of the 2002 farm bill until 3/15/2008 but did not extend the direct and counter-cyclical farm commodity programs. See Division A, §751. | | | | | | | 12/26/2007 |
| | Continued extension until 4/18/2008 and added extension of suspension of permanent law. | | | | | | | P.L. 110-161 |
| | Continued extension until 4/25/2008. | | | | | | | 3/14/2008 |
| | | | | | | | | P.L. 110-196 |
| | Continued extension until 5/2/2008. | | | | | | | 4/18/2008 |
| | | | | | | | | P.L. 110-200 |
| | Continued extension until 5/16/2008. | | | | | | | 4/25/2008 |
| | | | | | | | | P.L. 110-205 |
| | Continued extension until 5/23/2008. | | | | | | | 5/2/2008 |
| | | | | | | | | P.L. 110-208 |
| | | | | | | | | 5/18/2008 |
| | | | | | | | | P.L. 110-231 |
| 2002 farm bill | 7/26/2001 | 10/5/2001 | 11/27/2001 | 2/13/2002 | 5/1/2002 | 5/2/2002 | 5/8/2002 | 5/13/2002 |
| Farm Security and Rural Investment Act | H.R. 2646 | H.R. 2646 | S. 1731 | Amdt. to H.R. 2646 | H.Rept. 107-424 | H.R. 2646 | H.R. 2646 | P.L. 107-171 |
| Covers 2002-2007 crops or until 9/30/2007 | 8/2/2001 | Vote of 291-120 | 12/7/2001 | Vote of 58-40 | | Vote of 280-141 | Vote of 64-35 | |
| | H.Rept. 107-191 | | S.Rept. 107-117 | | | | | |

| | House Cmte. | House Passage | Senate Cmte. | Senate Passage | Conference Report Approval | | | Public Law |
|---|--|---------------------------|------------------------------|---|------------------------------|---------------------------|-------------------------|--------------------------|
| | | | | | Conf. Report | House Passage | Senate Passage | |
| 1996 farm bill | 1/5/1996 | 2/29/1996 | 1/26/1996 | 2/7/1996 | 3/25/1996 | 3/29/1996 | 3/28/1996 | 4/4/1996 |
| Federal Agriculture Improvement and Reform Act of 1996 | H.R. 2854 introduced | H.R. 2854 Vote of 270-155 | S. 1541 introduced | S. 1541 Vote of 64-32 | H.Rept. 104-494 | H.R. 2854 Vote of 318-89 | H.R. 2854 Vote of 74-26 | P.L. 104-127 |
| Covers 1996-2002 crops or until 9/30/2002 | Vote of 29-17 2/9/1996 H.Rept. 104-462 | | | 3/12/1996 Amdt. to H.R. 2854 Voice vote | | | | |
| Balanced Budget Act of 1995 | 10/26/1995 | 10/26/1995 | 10/28/1995 | 10/28/1995 | 11/16/1995 | 11/20/1995 | 11/17/1995 | 12/6/1995 |
| | H.R. 2491 includes H.R. 2195 | H.R. 2491 Vote of 227-203 | S. 1357 includes Senate bill | Amdt. to H.R. 2491 Vote of 52-47 | H.Rept. 104-347 | H.R. 2491 Vote of 235-192 | H.R. 2491 Vote of 52-47 | Vetoed |
| Freedom to Farm Act | 8/4/1995 | — | 9/28/1995 | — | — | — | — | — |
| | H.R. 2195 introduced | | unnumbered bill | | | | | |
| | 9/20/1995 fails cmte. | | | | | | | |
| Extension: | More than a year before expiration, extended the dairy program of the 1990 farm bill until 1996 and extended programs for wheat, feed grains, cotton, rice, peanuts, wool, and mohair until 1997 and honey until 1998. | | | | | | | 8/10/1993 P.L. 103-66 |
| 1990 farm bill | 2/5/1990 | 8/1/1990 | 7/6/1990 | 7/27/1990 | 10/22/1990 | 10/23/1990 | 10/25/1990 | 11/28/1990 |
| Food, Agriculture, Conservation, and Trade Act of 1990 | H.R. 3950 introduced | H.R. 3950 Vote of 327-91 | S. 2830 S.Rept. 101-357 | S. 2830 Vote of 70-21 | H.Rept. 101-916 | S. 2830 Vote of 318-102 | S. 2830 Vote of 60-36 | P.L. 101-624 |
| Covers 1991-1995 crops or until 9/30/1995 | 7/3/1990 H.Rept. 101-569 | | | | | | | |
| 1985 farm bill | 4/17/1985 | 10/8/1985 | 9/30/1985 | 11/23/1985 | 12/17/1985 | 12/18/1985 | 12/18/1985 | 12/23/1985 |
| Food Security Act of 1985 | H.R. 2100 introduced | H.R. 2100 Vote of 282-141 | S. 1714 S.Rept. 99-145 | H.R. 2100 Vote of 61-28 | H.Rept. 99-447 | H.R. 2100 Vote of 325-96 | H.R. 2100 Vote of 55-38 | P.L. 99-198 |
| Covers 1986-1990 crops or until 9/30/1990 | 9/13/1985 H.Rept. 99-271 | | | | | | | |
| 1981 farm bill | 5/18/1981 | 10/22/1981 | 4/7/1981 | 9/18/1981 | 12/9/1981 | 12/16/1981 | 12/10/1981 | 12/22/1981 |
| Agriculture and Food Act of 1981 | H.R. 3603 introduced | S. 884 Vote of 192-160 | S. 884 introduced | S. 884 Vote of 49-32 | H.Rept. 97-377 | S. 884 Vote of 205-203 | S. 884 Vote of 67-32 | P.L. 97-98 |
| Covers 1982-1985 crops or until 9/30/1985 | 5/19/1981 H.Rept. 97-106 | | 5/27/1981 S.Rept. 97-126 | | 12/10/1981 S.Rept. 97-290 | | | |
| 1977 farm bill | 5/13/1977 | 7/28/1977 | 1/18/1977 | 5/24/1977 | 9/9/1977 | 9/16/1977 | 9/9/1977 | 9/29/1977 |
| Food and Agriculture Act of 1977 | H.R. 7171 introduced | Amdt. to S. 275 | S. 275 introduced | S. 275 Vote of 69-18 | S.Rept. 95-418 | S. 275 Vote of 283-107 | S. 275 Vote of 63-8 | P.L. 95-113 |
| Covers 1978-1981 crops or until 9/30/1981 | 5/16/1977 H.Rept. 95-348 | Vote of 294-114 | 5/16/1977 S.Rept. 95-180 | | | | | |

| | House Cmte. | House Passage | Senate Cmte. | Senate Passage | Conference Report Approval | | | Public Law |
|--|--|------------------|---------------------|---------------------|----------------------------|-----------------|----------------|---------------------------|
| | | | | | Conf. Report | House Passage | Senate Passage | |
| 1973 farm bill | 6/20/1973 | 7/19/1973 | 5/23/1973 | 6/8/1973 | 7/31/1973 | 8/3/1973 | 7/31/1973 | 8/10/1973 |
| Agriculture and Consumer Protection Act | H.R. 8860 introduced | Amdt. to S. 1888 | S. 1888 introduced | S. 1888 | H.Rept. 93-427 | S. 1888 | S. 1888 | P.L. 93-86 |
| Covers 1974-1977 crops or until 6/30/1977 | 6/27/1973 H.Rept. 93-337 | Vote of 226-182 | S.Rept. 93-173 | Vote of 78-9 | | Vote of 252-151 | Vote of 85-7 | |
| 1970 farm bill | 7/23/1970 | 8/5/1970 | 9/4/1970 | 9/15/1970 | 10/9/1970 | 10/13/1970 | 11/19/1970 | 11/30/1970 |
| Agricultural Act of 1970 | H.R. 18546 | H.R. 18546 | Amdt. to H.R. 18546 | Amdt. to H.R. 18546 | H.Rept. 91-1594 | H.R. 18546 | H.R. 18546 | P.L. 91-524 |
| Covers 1971-1973 crops | H.Rept. 91-1329 | Vote of 212-171 | S.Rept. 91-1154 | Vote of 65-7 | | Vote of 191-145 | Vote of 48-35 | |
| Extension: | More than a year before expiration, extended the 1965 farm bill for one-year until 12/31/1970. | | | | | | | 10/11/1968 P.L. 90-559 |
| 1965 farm bill | 7/20/1965 | 8/19/1965 | 9/7/1965 | 9/14/1965 | 10/6/1965 | 10/8/1965 | 10/12/1965 | 11/4/1965 |
| Food and Agricultural Act | H.R. 9811 | H.R. 9811 | Amdt. to H.R. 9811 | Amdt. to H.R. 9811 | H.Rept. 89-1123 | H.R. 9811 | H.R. 9811 | P.L. 89-321 |
| Covers 1966-1969 crops | H.Rept. 89-631 | Vote of 221-172 | S.Rept. 89-687 | Vote of 72-22 | | Vote of 219-150 | Voice vote | |

Source: CRS, using <http://www.congress.gov>. Includes only major legislative actions. Excludes subsequent revisions, such as in budget reconciliation, except for extensions as noted.

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All Data Big and Small: Legal Issues Surrounding Agricultural Data

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All Data, Big and Small

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I. INTRODUCTION

A. Abstract

Drones and advanced sensing equipment on agricultural machinery can provide farmers and ranchers unprecedented insights to their own operations. Uploading, aggregating, and analyzing data across multiple operations (a process often referred to as “Big Data”) also holds the potential to generate knowledge beneficial not only to producers but numerous other segments of the agricultural industry. However, many producers have numerous concerns about their rights with respect to the data generated by them or, in some cases, about them. This article addresses some of the legal concerns involved both with data acquisition and with data rights. Regardless of how data about their operations is acquired, though, producers should work with their attorneys to craft data use agreements to protect their interests, as few existing laws deal with these issues.

B. The Brave New World of Farm Data

“Big Data” is one of the biggest buzzwords in the arena of agricultural technology right now and may receive almost as much discussion in agriculture as the weather and commodity prices. But what is Big Data anyway, and why should farmers care? This article aims to define both “Small” and “Big” Data, and to reveal its advantages and disadvantages for farmers. The discussion then turns to the concerns farmers express about disclosing farm data, and provides concrete solutions for what they can do individually and collectively to address those concerns.

1. Drones and Other Data Acquisition Tools

As many in Generation X learned from School House Rock, “knowledge is power!” Increasingly, agricultural producers rely on advanced analytics for their operations to optimize their operations and stay “in the black” in an era of increased volatility for input prices and production conditions. These analytics are only as good as the data that drives them, though, and producers have more tools than ever to acquire that data.

One important potential source of this data is the Unmanned Aerial Vehicle (UAV), more commonly called a “drone.” Though there are numerous definitions of “UAV” or “drone,” the FAA Modernization and Reform Act of 2012 defines the term “unmanned aircraft system” (sufficiently synonymous with UAV for the purposes of this discussion) as “an unmanned aircraft and associated elements (including communication links and the components that control the unmanned aircraft) that are required for the pilot in

command to operate safely and efficiently in the national airspace system.” P. Law 112-95 (H.R. 658-62), § 331(9).

The opportunity for producers to fly over their operations for relatively little cost and virtually no risk to life (at least their own) opens a number of doors for them to gain much better data of crop and pasture conditions through both visual and non-visual spectrum (such as infrared) data that can look at entire parcels at once. Imagery from drones can even be orthorectified through relatively inexpensive software to provide detailed measurements of land. Additionally, drones can be used to check on livestock, proving particularly useful on large operations and/or those with rugged, inaccessible terrain. Indeed, the potential uses of drone technology are almost innumerable.

At the same time, though, any new technology comes with risks and fears of misuse. Privacy and safety concerns are perhaps two of the largest issues swirling around agricultural drone use. When flying at any appreciable altitude, a camera-equipped drone can see not only the property over which it flies, but adjoining parcels. Naturally, this raises concerns of privacy, with those concerns drastically exacerbated by public proclamations of groups critical of standard agricultural practices that they will deploy drones to overfly agricultural operations in circumvention of “ag-gag” laws and to surveil livestock operations for potential environmental and animal well-being violations. *See* Lowe, P., “Drone to Fly Over Livestock Operations and ‘Ag-Gag’ Laws,” Nebraska Educational Telecommunications Commission / Harvest Public Media, August 25, 2014. *Available at* <http://www.netnebraska.org/article/news/933744/drone-fly-over-livestock-operations-and-ag-gag-laws>. Pilots flying at low altitudes are also concerned about potential mid-air collisions with drones, as noted by a number of near-misses. *See* “Drone Sightings,” Wall Street Journal, November 26, 2014, *available at* <http://graphics.wsj.com/faa-drones/>.

2. “Small” and Big Data” on the Farm

The evolution and revolution in agricultural Big Data comes from the expansion of “Small Data” in agriculture. Recent years have seen remarkable growth in producers’ ability to collect data pertaining to their own operation through the growth of techniques and technologies such as grid soil sampling, telematics systems for farm equipment, Global Navigation Satellite Systems (GNSS), farm aerial imagery acquired via small unmanned aerial systems (sUAS), and the like. In simplest terms, “Small Data” consists of data isolated to the fields or farms where the data originated. Farmers who use information technology to conduct their own

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on-farm experiments, document yield penalties from poor drainage, or negotiate crop share agreements are using data that is considered “small.” Coble, Keith *et al*, 2017. *Big Data in Agriculture: A Challenge for the Future*, APPLIED ECONOMIC PERSPECTIVES AND POLICY, 40(1):79-96.

Drones represent only one of a myriad of tools now available to help producers accumulate data about their agricultural operations. Machinery-based and even hand-held sensors provide mountains of information about the operation of farm equipment as well as the inputs they apply, the crops they harvest, and even the ground over which they run. This data can be wirelessly uploaded to consultants and cloud-based data storage warehouses, sometimes even without any intervention on the part of the operator. The ability to aggregate data over hundreds or even thousands of farms creates the power to conduct analyses more powerful than ever-before imagined.

These capabilities give rise to the issue of “Big Data.” While the term Big Data is relatively new, it refers to a concept that is not. There are many definitions for the term, but a straight-forward one might be “a collection of data from traditional and digital sources inside and outside your company that represents a source for ongoing discovery and analysis.” Arthur, Lisa. 2013. What is Big Data? Forbes, CMO Network blog entry, available at <http://www.forbes.com/sites/lisaarthur/2013/08/15/what-is-big-data/>. While this definition sounds much like traditional data analysis (and it is), recent advances in both data collection and transmission increase the analytical power of datasets by orders of magnitude. Not only do companies now have access to data from every link in their supply and marketing chain from sensors on the factory equipment to GPS on delivery trucks and bar code scanners in the store; they can now track search engine inquiries for their product and listen directly to conversations about their products in social media. This profusion of data creates an enormous dataset, the analysis of which can do everything from predict the hot toy for Christmas this year to tell the Centers for Disease Control ground zero in the next influenza outbreak. Google.org. 2011. “Google Flu Trends: How Does it Work?” available at http://www.google.org/flutrends/intl/en_gb/about/how.html).

Given these considerations, a more complete definition of “Big Data” requires data considered truly “big” possess the following traits (Coble, Keith *et al*, 2016.” Advancing U.S. Agricultural Competitiveness with Big Data and Agricultural Economic Market Information. Council on Food, Agricultural, and Resource Economics report):

Volume: The amount of data is so large it cannot be stored on one physical volume such as a hard drive; put

another way, the analytical software must “go to” the data rather than the data being “brought to” it.

Velocity: The data comes at higher rates than can be handled by a single computer.

Variety: The data comes from a broad array of sources including data automatically gathered by sensors and software as well as data manually entered by users. This also means the data may come in a variety of formats with a lack of structure or design to it.

Veracity: The data analytics are required to consider the accuracy and credibility of the data, especially considering the “variety” considerations mentioned above and the potential for mis-calibration of automated data collection systems or user error (and bias) coming from manually-entered data.

The agricultural industry stands on the front line with other industries in the Big Data revolution. In agriculture, tremendous leaps in data acquisition equipment on everything from tractors to granaries coupled with instantaneous and continuous transmission of that data through cellular modems creates a dataset soon to rival that of any industry. In a farm context, Big Data means farmers can not only analyze their own production data in ways never before possible; they can also aggregate their data with other producers to drastically increase their ability to detect trends in everything from seed variety performance to the comparative economics of cultivation practices. As anyone who has taken a statistics class knows, the predictive power of a dataset grows with its size. The exponential growth of farm data means farmers will soon have analytic tools to rival those of any industry.

3. The Promise and Peril of Big Data on the Farm

If Big Data posed nothing but advantages, its discussion would not have the fevered pitch currently seen across virtually every agricultural media source. As with any tool, Big Data is neither inherently good nor evil – it is simply a tool. As with any tool, its benefits and dangers lie in how one uses it. Following is a discussion of these potential advantages and disadvantages.

Many a farm management teacher has proclaimed “you can’t manage what you can’t measure,” and today’s farmer lives in an era where almost everything on the farm can be measured, giving him or her the power to manage elements of agricultural production heretofore unimaginable. Improvements in farm equipment diagnostic and data acquisition systems alone provide the potential to diagnose equipment issues before they manifest themselves in downtime and to monitor a crop at literally every step of the production process from planting through cultivation and to harvest. One need only watch John Deere’s “Farm

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Forward” video to see a host of innovations made possible by these technologies and to realize that these possibilities are not as far away as one might think. John Deere, Inc. “Farm Forward (video) *available at* <https://www.youtube.com/watch?v=jEh5-zZ9jUg>.

Looking one step up the data ladder from the farm, cellular modem technology means producers can instantly and continuously share data with crop advisors and other consultants. These consultants can analyze this data (using their own Big Data tools), prepare recommendations, and even create prescriptions that can be uploaded to the producer’s equipment to make on-the-fly adjustments to seeding, fertilizer, pesticide, and cultivation practices.

While these advantages alone make the prospects of Big Data tantalizing, the power of Big Data only comes to full force when it is truly big. What if equipment companies, consultants, and input suppliers combined the data from thousands of farmers into one massive dataset? Seed trials could be conducted in a fraction of the time as varieties could be compared across hundreds or even thousands of farms representing dozens of soil types, microclimates, and production systems simultaneously. The costs and benefits of various production systems and cultivation practices could be analyzed with similar speed. Plant disorders could be isolated and eradicated before costing producers their entire crops.

Lest one think any of these prospects to be far-fetched, many of them are (or soon will be) a reality. John Deere already uses real-time telematics data to analyze potential equipment failures to dispatch service technicians, and has partnered with Pioneer to provide near-real-time crop recommendations that can be uploaded to the farmer’s equipment (Eckelkamp, 2013). Eckelkamp, Margy. 2013. John Deere Partners with Open Platform. Agweb.com, *available at* http://www.agweb.com/article/john_deere_partners_with_open_platform_NAA_Margy_Eckelkamp/.

Monsanto’s work through The Climate Corporation looks to create massive datasets to analyze a host of issues from plant variety protection to the impacts of climate change on crop production systems (Upbin, 2013). Just as the constantly increasing speed and decreasing size of processors continues to yield evermore-powerful computers, so too may one expect new applications of Big Data to farm issues.

Any new technology carries potential harms, whether real or imagined. In the realm of Big Data, recent history suggests many of the real threats come from insufficient controls to prevent the disclosure of personally identifiable information (“PII”) to outside parties and inadequate agreements on the uses of data by parties to whom it is disclosed.

One need not look far into the past to find numerous examples of the disclosure of PII, whether merely inadvertent or the result of targeted hacker attacks.

Attacks on companies’ payment systems have resulted in the credit card information of hundreds of millions of customers from Adobe Systems (150 million customers), Heartland Payment Systems (130 million customers), TJX (parent company of TJ Maxx and Marshalls, 94 million customers), TRW Information Systems (credit reporting company, 90 million customers), Sony (70 million customers) all of which dwarf breaches attracting more media attention such as Home Depot (56 million customers) and Target (40 million customers). Pepitone, Julianne. 2013. “5 of the Biggest-ever Credit Card Hacks.” CNN Money. *available at*

<http://money.cnn.com/gallery/technology/security/2013/12/19/biggest-credit-card-hacks/>.

Credit card theft may be the most direct form of PII theft, but theft of other individual pieces of information such as Social Security Numbers, addresses, and birthdays may allow a criminal to fabricate an identity as well. Farmers are understandably concerned that PII may be stolen if that information is disclosed to an outside party such as a financial consultant. However, most data disclosed to a crop production consultant will be in the form of raw data regarding crop production, GIS information about the farm, and the like. This significantly reduces the risk of identity theft by someone obtaining the data by illicit means. Nevertheless, farmers should still be aware of the data they are disclosing to providers as discussed later in this paper.

The theft of PII by criminals is one threat posed by data transfers, but so too is the inadvertent, or perhaps intentional but misinformed, disclosure of data by the party receiving that data. Take, for example, the disclosure of thousands of “farmers’ and ranchers’ names, home addresses, GPS coordinates and personal contact information” by EPA in response to a Freedom of Information Act (FOIA) request regarding concentrated animal feeding operations (CAFOs) which prompted a lawsuit from the American Farm Bureau Federation and National Pork Producers Council alleging that the agency overstepped its authority in doing so (Wyant, 2013). Wyant, Sara. 2013. “Farm Groups File Lawsuit to Stop EPA Release of Farmers’ Personal Data.” Agri-Pulse, *available at* <http://www.agri-pulse.com/Farm-groups-file-lawsuit-to-stop-EPA-release-of-farmers-personal-data-07082013.asp>.

While this event represents the disclosure of information by an enforcement agency, many farmers fear the converse - that an enforcement agency could compel a data-receiving party to disclose information even if such disclosure were not legally required. Another concern is whether an adverse party in litigation (or even a party contemplating litigation) could persuade a party holding a farmer’s data to disclose the data as an aid to their case, again even if such disclosure was not legally required.

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Still another issue of concern for farmers, but clearly not limited to farmers, is how data – some willingly disclosed via social media platforms such as Facebook, Twitter, Instagram, and others – can be used for purposes well beyond those conceived when the user agrees to participate in such platforms. The myriad uses of data to psychometrically analyze and potentially manipulate users were highlighted in the Cambridge Analytica controversy. *See* Granville, Kevin, 2018. “Facebook and Cambridge Analytica: What you Need to Know as Fallout Widens,” *New York Times*, March 19, 2018.

Indeed, a number of potential data uses lie within a gray area of conduct. These uses may seem wrong or at least uncomfortable at an intuitive level, but are not illegal at this point in time. The first such use – highly targeted or “laser” marketing – is encountered almost every day as one sees online ads through Google search results or Facebook selected based on a user’s online profile. In some cases, this marketing can become uncomfortably precise and predictive, as was recently publicized by a recent story showing how Target’s retail analytics could predict shoppers were pregnant (Duhigg, 2012). Duhigg, Charles. 2012. “How Companies Learn Your Secrets.” *The New York Times Magazine*, available at <http://www.nytimes.com/2012/02/19/magazine/shopping-habits.html?pagewanted=1&r=2&hp&>. In the agricultural realm, many of the consulting service providers to whom farmers are disclosing data are the same companies (or affiliates of companies) providing a number of other inputs such as seed, fertilizer, pesticide, and equipment. At a minimum, one could see a potential conflict of interest in such companies recommending products their affiliate provide, and at a maximum a customer could be barraged by solicitations for products based on their production patterns. Taken one step further, could such companies manipulate commodity markets themselves? If one thinks about it, equipment companies already have fleets of combines and other harvesters continuously uploading harvest data to their servers – what better market intelligence could one have? Although such behavior could arguably fit into some legally-prohibited practices, it is also arguably outside the reach of those prohibitions in that “really good intelligence” might not be regarded by courts as price manipulation. 17 C.F.R. § 180.1 (2015).

Salon.com summarized many of these fears in its article “Monsanto’s Scary New Scheme: Why Does it Really Want All This Data?” Khan, Lina. 2013. “Monsanto’s Scary New Scheme: Why Does It Really Want All This Data?” *Salon.com*, available at http://www.salon.com/2013/12/29/monsantos_scary_new_scheme_why_does_it_really_want_all_this_data/. Although the story may be speculative in some of the prospective problems it outlines, the old adage “perception is reality” bears some weight in the Big

Data discussion. Although many argue that the potential advantages of Big Data on the farm will significantly outweigh the potential disadvantages (pointing out that any firms abusing the data relationship with producers will soon find themselves out of business), the perceptions of those concerns prevent many producers from exploring Big Data applications.

II. PROTECTING FARM DATA

A. Where does farm data fit in the current intellectual property framework?

The United States of America has one of the most robust systems of property rights in the world, empowered by a legal system making it (relatively) easy to enforce those rights. Thus, the first place many look for a means of protecting one’s data from misappropriation and/or misuse is the property rights system. This requires one to examine who “owns” farm data. The answer to the question is not easy, though, as traditional notions of property ownership find challenge in their application to pure information.

The notion of property ownership typically involves some form of six interests, including the right to possess (occupy or hold), use (interact with, alter, or manipulate), enjoy (in this context, profit from), exclude others from, transfer, and consume or destroy. Some of these interests do not fit, or at least do not fit well, with data ownership. Excluding others from data, for example, is difficult, particularly when it is possible for many people to “possess” the property without diminishing its value to the others, just as the value of a book to one person may not be diminished by the fact other people own the same book. Smith, Lars. 2006. “RFID and other embedded technologies: who owns the data?” *SANTA CLARA COMPUTER AND HIGH TECHNOLOGY LAW JOURNAL* 22:4, 695. Thus, the better question may be “what are the rights and responsibilities of the parties in a data disclosure relationship with respect to that data?” (Petersen, 2013). Peterson, Rodney. 2013. “Can Data Governance Address the Conundrum of Who Owns Data?” *Educause* blog, <http://www.educause.edu/blogs/rodney/can-data-governance-address-conundrum-who-owns-data>.

Data is difficult to define under traditional notions of tangible property, but the intellectual property framework serves as a useful starting point to define what rights a farmer might have to their farm data. Intellectual property can be divided into four categories: (1) trademark, (2) patent, (3) copyright, and (4) trade secret. The first three areas compose the realm of federal intellectual property law as they are defined by the Constitution as areas in which Congress has legislative authority. U.S. Constitution, Article I, §8,

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clause 8. For the purposes of the following discussion, “farm data” will include the types of data typically uploaded automatically by the farmer’s equipment, such as diagnostic and use data, input application data, harvest data, and global positioning system (GPS) and geographic information system (GIS) data.

1. Trademark

One of the easiest intellectual property models to discard as a viable farm data protection tool is trademark. The Federal Trademark Act (sometimes called the Lanham Act) defines trademark as “any word, name, symbol, or device, or any combination thereof...to identify and distinguish his or her goods, including a unique product, from those manufactured or sold by others and to indicate the source of the goods, even if that source is unknown.” 15 U.S.C. § 1127. Examples of trademark include product names, such as Coca-Cola® or the design of its contoured bottle. One quickly realizes trademark fits poorly as a model for defining farm data ownership, as trademark addresses intellectual property used for branding purposes rather than information.

2. Patent

The U.S. Patent Act states “whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor.” 35 U.S.C. § 101. Generally, for an invention to be patentable, it must be useful (capable of performing its intended purpose), novel (different from existing knowledge in the field), and non-obvious (somewhat difficult to define, but as set forth in the Patent Act, “a patent may not be obtained... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains”). 35 U.S.C. §§ 102, 103. Patent serves as a poor fit for a model of farm data ownership since it protects “inventions.” Raw data, such as farm data, would not satisfy the definition of invention.

It should be noted patentable inventions could be derived from the analysis of farm data. While this does not mean the data itself is patentable, it does suggest that the agreement governing the disclosure of farm data by the farmer should address who holds the rights to inventions so derived (as discussed below).

3. Copyright

The federal Copyright Act states the following:

Copyright protection subsists, in accordance with this title, in original works of authorship fixed in any tangible medium of expression, now known or

later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device. Works of authorship include the following categories:

literary works;
musical works, including any accompanying words;
dramatic works, including any accompanying music;
pantomimes and choreographic works;
pictorial, graphic, and sculptural works;
motion pictures and other audiovisual works;
sound recordings; and
architectural works.

17 U.S.C. § 102(a). More so than trademark and patent, the copyright model at least resembles a model applicable to farm data. At the same time, however, the model also has numerous problems in addressing agricultural data. First, the list of “works of authorship” provided in the statute strongly suggests a creative component is important to the copyrightable material. Second, the term “original works of authorship” also has been interpreted to require some element of creative input by the author of the copyrighted material. This requirement was highlighted in the case of *Fiest Publications Inc. v. Rural Telephone Service Company*, 499 U.S. 340 (1991), where the U.S. Supreme Court held that the Copyright Act does not protect individual facts.

In *Fiest Publications*, the question was whether a pure telephone directory (consisting solely of a list of telephone numbers, organized alphabetically by the holder’s last name) was copyrightable. Since the directory consisted solely of pure data and was organized in the only practical way to organize such data, the Supreme Court held the work did not satisfy the creative requirements of the Copyright Act. This ruling affirmed the principle that raw facts and data, in and of themselves, are not copyrightable. However, an author can add creative components to facts and data such as illustrations, commentary, or alternative organization systems and can copyright the creative components even if they cannot copyright the underlying facts and data. Put another way, the facts that hydrogen has an atomic number of 1 or that the number of ABC Plumbing is 555-1234 are not copyrightable, but an article about hydrogen in an encyclopedia or a Yellow Pages® ad with ABC Plumbing’s number along with a graphic and description of their services are.

As with patent, farm data can lead to copyrightable works even if the underlying data is not protected itself. For example, farm data may not be copyrightable, but a

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report summarizing the data and adding recommendations for action might be. Again, then, it is incumbent upon those disclosing farm data to include language in their agreements with the receiving party to define the rights to such works derived from the data.

4. Why trade secret might work as a farm data framework

While trademark, patent, and copyright do not appear to fit as models for farm data ownership, trade secret has the potential to fit the bill. Importantly, trade secret is a function of state law (unlike trademark, patent, and copyright, which are all creatures of federal law). As of this writing, all but three states have adopted the Uniform Trade Secrets Act, providing a significant degree of consistency in trade secret law across most states.

Under the Uniform Trade Secrets Act, a “trade secret” is defined as:

...information, including a formula, pattern, compilation, program, device, method, technique, or process, that:

- (i) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use, and
- (ii) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

Uniform Trade Secret Act, § 1. Importantly, this definition makes clear that “information... pattern[s], [and] compilation[s]” can be protected as trade secret. This, at last, affords hope of a protective model for farm data. This is not to say that trade secret is a “slam dunk” for protecting farm data, however. Note the two additional requirements of trade secret: first, that the information has actual or potential economic value from not being known to other parties, and second, that it is the subject of reasonable efforts to maintain the secret.

The first provision requires that to be protected as a trade secret, farm data such as planting rates, harvest yields, or outlines of fields and machinery paths must have economic value because such information is not generally known. While a farmer may (or may not) have a privacy interest in this information, the question remains as to whether the economic value of that information derives, at least in part, from being a secret. The counterargument to that point is that the economic value of the information comes from the farmer’s analysis of that information and the application of that analysis to his or her own operation – a value completely independent of what anyone else does with that information – and that the information for that farm, standing alone, has no economic value to anyone else since that information is useless to anyone not farming that particular farm. One can see then this first element

poses problems for the trade secret model. It should be noted here that there is a clear economic benefit to the collection of farm data; otherwise Monsanto would not spend nearly \$1 billion in acquiring a company to aggregate such data. This represents a question yet to be answered clearly by the body of trade secret law: whether one can have trade secret protection in information that standing alone has no economic value to other parties, but does have such value when aggregated with similar data from other parties.

The second provision – that the data be subject to reasonable efforts to maintain its secrecy – also finds problems in an environment where the data is continuously uploaded to another party without the intervention of the disclosing party. The fact that data is disclosed to another party does not mean it cannot be protected as a trade secret; if that were the case, there would be little need for much of trade secret law. Rather, the question is how and to whom the information is disclosed. As noted in the Restatement (Third) of Unfair Competition’s comments on the Uniform Trade Secret Act, “...the owner is not required to go to extraordinary lengths to maintain secrecy; all that is needed is that he or she takes reasonable steps to ensure that the information does not become generally known.” (Smith, 2006, *citing* Restatement, 1995). The question becomes what constitutes “reasonable steps” to keep continuously uploaded data protected. Almost certainly this means there must be some form of agreement in place between the disclosing party and the receiving party regarding how the receiving party must treat the received information, including to whom (if anyone) the receiving party may disclose that information.

While an explicit written agreement is not necessary to claim trade secret protection, such an agreement is almost certainly a good idea. Not only can such an agreement clarify a number of issues unique to the relationship between the disclosing and receiving parties; it can also address numerous novel issues in the current information environment that trade secret law has not yet reached.

B. The Importance of Non-Disclosure Agreements

As the reader can see from the preceding discussion, there is not an intellectual property model presenting a spot-on fit for the protection of agricultural data. Trade secret comes closest, and if indeed a farmer can prove their data is protectable information (with the burden of such proof resting on the farmer), no agreement is needed to provide such protection. However, this scenario poses a tremendous amount of uncertainty and requires costly, time-consuming litigation.

Conversely, farmers disclosing their data, and service providers receiving it, proactively could enter a non-disclosure agreement (NDA) in which both parties

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agree in advance to hold the information confidential and agree to what uses can and cannot be made of the data. Such an agreement may be entered even if the information would not be regarded as a trade secret, since the parties covenant to treat the information as secret independently; the obligations of the party derive from the contract itself and not another legal doctrine. The following discussion addresses attempts to address some NDA issues by corporate policies, and the provisions that should be considered by farmers when negotiating an NDA with a party to whom they will be disclosing farm data.

Many companies offering consulting or data analysis services have company policies addressing various concerns such as confidentiality of the information, specifying to whom the data may be disclosed, and uses that may be made of the data. Examples of such policies can be found in the Climate Corporation (2014) and John Deere (2014) data privacy statements. As an example of these policies, below is an excerpt from the John Deere Privacy and Data Statement:

John Deere understands that you may not want us to provide Personal Information and Machine Data to third parties for their own marketing purposes. We limit our sharing of Personal Information and Machine Data as follows:

We may share Personal Information and Machine Data with our affiliated companies, suppliers, authorized John Deere dealers and distributors, and business partners, which may use it for the Purposes listed above.

We may also share Personal Information and Machine Data with our service providers to fulfill the Purposes on our behalf. Our service providers are bound by law or contract to protect the information and data, and to only use it in accordance with our instructions.

We may disclose Personal Information and Machine Data where needed to affect the sale or transfer of business assets, to enforce our rights, protect our property, or protect the rights, property or safety of others, or as needed to support external auditing, compliance and corporate governance functions.

We will also disclose Personal Information and Machine Data when required to do so by law, such as in response to a subpoena, including to law enforcement agencies and courts in the United States and other countries where we operate.

John Deere, Inc. 2014. Privacy and Data, *available at* https://www.deere.com/privacy_and_data/privacy_and_data_us.page. Policy statements can have value, but they are only legally enforceable if their text is incorporated by reference into a binding agreement between the farmer and the service provider. This underscores the need for some form of NDA. However,

the relative bargaining power between the farmer and the service provider will obviously vary. Negotiating the terms of “boilerplate” agreements large corporations will provide to their customers will likely require high-level collective discussions between industry groups and corporate service providers (see the Epilogue). This discussion presumes at least some parity in bargaining power between the farmer and the service provider receiving the farm data.

The following is a list of items the farmer and his or her attorney should consider in drafting an NDA for the disclosure of farm data to a service provider. These considerations are compiled from the works of Bowden (1995) and Fishman and Stim (2001). Bowden, Brian. 1995. *Drafting and Negotiating Effective Confidentiality Agreements (with forms)*. The Practical Lawyer, 41:7, pp. 39-56.. Fishman, Stephen and Richard Stim (2001). *Nondisclosure Agreements: Protecting Your Trade Secrets and More*. Nolo Press.

- 1) Execute the agreement prior to data disclosure: Trade secret law will not protect information voluntarily disclosed or publicly available (see Uniform Trade Secret Act, § 1 above). Thus, it is critical the NDA be executed before the disclosure of any data.
- 2) Define who is disclosing and receiving the information: In most cases, the farmer will be the disclosing party, and the service provider will be the receiving party, though this is not necessarily always the case. In many cases, the obligations of the agreement will be defined the role of the party, so defining when those roles are triggered is important.
- 3) Define what information will be regarded as confidential: Blanket statements that all information disclosed by the farmer to the service provider may be ineffective as the protection of all information may be impractical or counterproductive to the services provided. As a result, the agreement should define what information is, and is not, to be kept confidential, whether by category of information or the channel by which such information is transmitted.
- 4) Exclude information that will not be regarded as confidential: By the same token, it may be useful to define what categories of information are not to be treated as confidential and may be disclosed without further consent from the parties. Other information may be discloseable, but only with the express written consent of the party providing the information.
- 5) Establish a duty to keep the information secret: Perhaps the most important portion of the agreement, an affirmative contractual duty should be established that the party receiving the information must keep it secret. On the

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- other side of the same coin, this portion of the agreement should also explicitly prohibit the disclosure of the information, and should also define the measures the receiving party must take to maintain the secrecy of the information. This portion of the agreement may also be accompanied by a time limit on its enforceability, which is usually defined by an event (such as execution of a release by the party providing the information, or the public disclosure of the information by that party) rather than a period of time.
- 6) Specifically allowed/prohibited uses of information: This section of the agreement can spell out what uses of the information are specifically allowed, and which are specifically prohibited. The farmer and his or her attorney will wish to use care in making sure that the beneficial uses of the data motivating the farmer to seek the service provider's services are not blocked by these terms.
 - 7) Data destruction requirements: The farmer may wish to require the destruction of all data transmitted to the service provider in the event of a breach of the agreement by the service provider or some other event terminating the agreement. While there may be merit in such provisions, it should also be noted that data destruction in today's highly-interconnected computing environment may be a practical impossibility. The most one may be able to achieve is the destruction of any hardcopies of the information and the complete erasure of physical drives where the data is stored.
 - 8) Provision for injunctive relief: Without boring the reader with a discussion of civil procedure rules, suffice it to say that proving the case for "injunctive relief" (that is, an order from a court commanding an offending party to immediately cease a harmful activity such as releasing data, as opposed to the much more common remedy of ordering the offending party to pay monetary damages to the injured party) can be both costly and time-consuming, permitting the farmer to suffer continuing damages from data disclosure until it is stopped. A provision stating that the parties both agree that injunctive relief is appropriate in the specified circumstances can drastically shorten this process and limit the expenses in securing such relief.
 - 9) Indemnity clause: The farmer may desire a clause stating the service provider will indemnify the farmer for any of his or her expenses (or the expenses of third parties asserting a claim against the farmer) caused by the wrongful disclosure of data.
 - 10) Integration clause: An integration clause will state the entire agreement between the parties has been reduced to writing through the NDA. The effect of the integration clause is to exclude evidence of the parties' discussions in the negotiation of the agreement and to limit the resolution of any disputes to the language in the agreement itself. If the parties agree to an integration clause, it is critical all of their concerns be addressed in the text of the agreement.
 - 11) Attorney's fees: The "American Rule" in most civil litigation is the parties pay for their own attorney's fees, unless a statute or other legal rule overrides this presumption. Frequently, contracts override this rule and require the losing party pay the prevailing party's costs; this is usually an attempt to minimize the chance of frivolous claims by one party. Farmers should use care in the inclusion of such language since it may result in the payment of significant legal fees if they should initiate what is eventually proven to be an unsuccessful claim against the service provider.
 - 12) Alternative Dispute Resolution (ADR) and venue provisions: The parties may want to require any dispute among them be first submitted to ADR (arbitration or mediation) before the claim may be litigated. Large corporations often prefer arbitration as it may be faster and less expensive than litigation, but a growing body of research suggests arbitration may favor the corporation over other plaintiffs. The farmer may wish to specify mediation as a first line of ADR. At the same time, many large corporations fear they will be treated unfairly at the hands of local juries, where the opponent will have "home field advantage." This may or may not be true; by the same token, if there is to be such an advantage, does the farmer wish to relinquish it?
 - 13) Disclosure under legal process: One situation in which the receiving party may have little choice in disclosing information is when they are legally compelled to do so. However, there may be disagreement about when a party is "legally compelled" to disclose information. To provide the best possible opportunity for both parties to determine if such disclosure is indeed legally required, many attorneys recommend a fourfold approach: (a) disclosure of the information is prohibited unless the receiving party is subpoenaed or otherwise compelled by some form of legal process; (b) the disclosing party must be given as much notice as possible, allowing them to contest the legal process; (c) the receiving party must use best efforts to

All Data, Big and Small

cooperate with the disclosing party; and (d) the receiving party may disclose only information which, in the written opinion of its legal counsel, it is required to disclose.

- 14) Liquidated damages: It may be difficult (or even impossible) to determine the amount of damages that the farmer has sustained from the disclosure of protected information. As a result, the farmer may wish to define an amount of liquidated damages in advance. Liquidated damages are simply an amount, agreed to in advance of a contractual breach, to be paid if a breach is proven to have occurred. The counterpoint to liquidated damages is that they serve as both a floor and ceiling to claimed damages; even if a farmer sustained greater damages than those negotiated in the liquidated damages provision, he or she will likely be deemed to have waived any claim to a greater damage amount.

III. CONCLUSIONS

Acquiring farm data via the use of drones currently poses a number of regulatory challenges, although continued pressure on the FAA to open up more avenues for drone use may eventually ease those restrictions.

Regardless of how farm data is acquired, though, Big Data on the farm holds the promise for tools heretofore undreamt of – tools necessary for the American farmer to meet the challenges of feeding a world population of 9 billion by the end of the 21st Century. At the same time, there are many concerns about the potential misuses of Big Data. Some of these concerns may prove to be more imagination than fact, but recent history is replete with reasons for those disclosing data to have legitimate reasons for seeking the assurance of data security. At the individual level, thoughtful consideration of the advantages and disadvantages of data use and the negotiation of thorough and balanced NDAs can do much to protect farmers' data interests. At the industry level, continued discussion of these issues can lead to proactive, negotiated solutions between large service providers and the agriculture industry.

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LEGAL CHALLENGES FACING UNMANNED AERIAL SYSTEMS AND COMMERCIAL AGRICULTURE

I. INTRODUCTION

Unmanned aircraft have existed for many years, but recent advancements in technology have prompted a rapid increase in their use.¹ By 2020, over 2.7 million small unmanned aircraft systems (UAS) could be navigating the nation's airspace for commercial purposes.² If estimates are accurate, agriculture will be one of the top industries employing UAS technology³ and will represent approximately 80% of the worldwide UAS market.⁴ The usefulness of UAS technology for agriculture leads some to predict that every farm or ranch will soon have one or two UAS.⁵ Conversely, UAS also present risks and liabilities for commercial agricultural businesses and landowners. UAS offers a surveillance tool that may infringe upon perceived property and privacy rights and that, in the hands of those opposed to agricultural production or desiring to cause public harm, could be used to mischaracterize agricultural practices or harm agricultural property and goods.

***390** UAS technology has evolved much more quickly than a corresponding legal framework for UAS use. At the federal level, the surge in small UAS activity caught the FAA off guard and without a clear Congressional man-date for regulating UAS until Congress enacted the Federal Aviation Administration Modernization and Reform Act of 2012 (FMRA).⁶ The FAA took a rigid approach for those seeking to use UAS for “commercial” purposes such as farming and ranching. Drawing a clear regulatory boundary between recreational and non-recreational uses, the agency declared the need for commercial, non-recreational operators of UAS to have certified aircrafts, certified pilots, and operating approval from the FAA.⁷ The agency's interpretation required agricultural operators to pursue flight authorization from the FAA through its Section 333 exemption process⁸ while the FAA developed specific regulations for the commercial operation of UAS. The specific regulations arrived several years later in 2016, when the FAA published its Final Rule to regulate small UAS used for commercial purposes.⁹

The lack of federal regulations to address airspace safety issues coupled with concerns over the potential misuse of UAS for surveillance, harassment, and personal or property harm has compelled many states to confront UAS issues.¹⁰ As a result, state UAS legislation has swept the nation.¹¹ ***391** Undoubtedly, the new state laws will affect agriculture, either because they place additional operating requirements on agricultural UAS users or because they provide rights and remedies for potential UAS misuse by or against agricultural users and businesses.

This article examines the evolving federal and state legal landscapes that will impact agriculture's legal relationship with UAS technology. Part Two begins with an explanation of the FAA's new regulations for small UAS that now govern

commercial agricultural operators. In Part Three, we review recently enacted state laws that address issues of importance to agricultural businesses. Part Four presents problems and challenges facing agriculture as it navigates the legal UAS landscape.

II. FAA'S FINAL RULE FOR SMALL UNMANNED AIRCRAFT SYSTEMS

The final rule for the *Operation and Certification of Small Unmanned Aircraft Systems* (Small UAS Rule) was published on June 28, 2016, a direct outcome of FMRA.¹² In FMRA, Congress confirmed its intent to safely integrate UAS technology into the national airspace and directed the Secretary of Transportation to develop a comprehensive plan for doing so.¹³ The Small UAS Rule largely replaced the burdensome Section 333 process to allow for routine civil operation of small UAS in the national airspace.¹⁴ Following a notice of proposed rulemaking that generated over 4,600 comments, the Small UAS Rule became effective on August 29, 2016.¹⁵

Part 107 of the Small UAS Rule regulates the commercial use of UAS weighing less than 55 pounds by establishing a remote pilot certification *392 process, a Remote Pilot in Command position, operational limitations, and a waiver process.¹⁶ We explain each of these provisions in the following sections.

A. Remote Pilot Certification

Under the Small UAS Rule, no person may act as a pilot in command of a small UAS unless the person has a remote pilot certificate with a small UAS rating (RPC).¹⁷ To obtain an RPC, an applicant must meet eligibility requirements, pass a knowledge test, and complete an application process.

1. Eligibility Requirements

An applicant for a RPC must be at least 16 years old; able to read, speak, write, and understand the English language; not know or have reason to know that he or she is in a physical or mental condition that would interfere with the safe operation of a small UAS; and be able to demonstrate aeronautical knowledge.¹⁸ The applicant may demonstrate such knowledge either by passing an aeronautical knowledge test or completing a training course for small UAS if the person already holds a pilot certificate issued under 14 C.F.R. part 61 other than a student pilot certificate.¹⁹

*393 2. Knowledge Test

An applicant for a RPC who doesn't already hold a pilot certificate must pass the unmanned aircraft general (UAG) knowledge test in person through an FAA-approved Knowledge Testing Center.²⁰

The test is an objective, 60-question, multiple-choice examination that covers the following areas as they relate to small UAS: (1) regulations regarding rating privileges; (2) limitations and flight operation; (3) airspace classification, operating requirements, and flight restrictions; (4) aviation weather sources and effects of weather on aircraft performance; (5) aircraft loading emergency procedures; (6) crew resource management; (7) radio communication procedures; (8) determining aircraft performance effects of drugs and alcohol; (9) aeronautical decision-making and judgment; (10) airport operations; and (11) maintenance and preflight inspection procedures.²¹

The FAA allows two hours to complete the test and requires a 70 percent passing score.²² If an applicant fails, he or she may apply to retake the test after a period of 14 days.²³

3. Remote Pilot Application

An eligible applicant who passes the UAG knowledge test must complete an application for the RPC.²⁴ The FAA administers the application online through its Integrated Airmen Certificate Rating Application System (IACRA)²⁵ and in paper form.²⁶ The application triggers a security threat assessment of the applicant by the Transportation Security Administration (TSA) to determine if the applicant poses a threat to transportation or national security, a risk of air piracy or terrorism, a threat to airline or passenger *394 safety, or a threat to civil aviation security.²⁷ A successful security screening results in the issuance of the RPC, and an applicant who applied through IACRA may print a temporary certificate immediately upon receiving the security confirmation.²⁸ If TSA believes an applicant presents a security threat, TSA will not approve the application and will advise the applicant of its action in a written Initial Determination of Threat Assessment.²⁹ The applicant may appeal the determination to the TSA within 60 days.³⁰ Once certified, a remote pilot must pass a recurrent knowledge test every 24 months to maintain certification.³¹

B. The Remote Pilot in Command Role

The final Small UAS Rule varies from the earlier proposed rule, which recommended creating an “operator” role for small UAS flight control but did not establish a “pilot in command” position similar to airmen regulations for other types of aircraft.³² To the contrary, in the final rule, the remote pilot certification allows a person to function as the pilot in command (Remote PIC) for a small UAS.³³ The new role expands the operator role from that envisioned in the proposed rule and recognizes the need to assign flight responsibilities to one of several “crewmembers” that may be involved in a small UAS flight.³⁴

The Small UAS Rule sets out a number of general responsibilities for Remote PICs. A Remote PIC must be designated before or during any non-recreational, small UAS flight and is directly responsible for the operation of the small UAS.³⁵ The Remote PIC must ensure that the aircraft does not pose a hazard to people, aircraft, or property in the event of a loss of control of the aircraft; ensure compliance with all applicable regulations; and have *395 the ability to direct the small UAS to ensure such regulatory compliance.³⁶ Importantly, the FAA grants a Remote PIC the discretion to vary from the Small UAS Rule's provisions in the event of an in-flight emergency that requires immediate action to the extent necessary to address the emergency.³⁷ Upon request, a Remote PIC who deviates from the rules in an emergency situation must provide a written report to the FAA.³⁸ Similar to other airmen certification rules, the Small UAS Rule allows a Remote PIC to supervise a small UAS flight by a person who does not have a RPC.³⁹ Such a person may manipulate the flight controls of a small UAS as long as a Remote PIC is able to directly and immediately take control of the flight.⁴⁰

The Small UAS Rule also contains specific directives for the Remote PIC in addition to the general operating limitations for small UAS flights. A Remote PIC must conduct an inspection of a small UAS prior to its flight.⁴¹ The rule specifies the components of a pre-flight inspection.⁴² An accident-reporting provision requires the Remote PIC to report to the FAA within ten days any operation of a small UAS that caused serious injury to a person, loss of consciousness, or damage of at least \$500 to any property other than the small UAS.⁴³

*396 C. Aircraft Requirements

There are several provisions in the Small UAS Rule that pertain to the aircraft used in a UAS flight. The small UAS must be in compliance with the FAA's registration requirements, which apply to unmanned vehicles weighing more than .55 pounds.⁴⁴ A small UAS must also be in a condition for safe operation,⁴⁵ a mandate that corresponds with the Small UAS Rule's emphasis on pre-flight inspections. The Small UAS Rule calls for discontinuation of a flight if the person operating the small UAS knows or should know that the aircraft is no longer in a condition for safe operation.⁴⁶ Upon request, a small UAS must be made available to the FAA for testing or inspection.⁴⁷

D. Operational Limitations

The rest of the Small UAS Rule lays out the constraints on where and how Remote PICs may operate small UAS. The limitations are intended to address the remainder of FAA's safety concerns and include see and avoid principles, contain and control provisions, flight-area restrictions, and prohibitions against hazardous operation.

1. See and Avoid Provisions

The FAA included several sections in the Small UAS Rule that aim to incorporate "see and avoid" principles for airspace collision avoidance. The visual line of sight (VLOS) rule states that the Remote PIC or person manipulating the flight controls of the small UAS must be able to see the aircraft throughout its entire flight without the aid of a visual device other than glasses or contact lenses.⁴⁸ This VLOS relationship with the aircraft requires that the operators be able to know the aircraft's location; determine its attitude, altitude, and flight direction; observe the airspace for air traffic and hazards; and ensure that the aircraft is not endangering another's life or property.⁴⁹

***397** The Remote PIC may rely upon a visual observer to help maintain the VLOS.⁵⁰ The FAA describes a visual observer as an optional crewmember who can augment the small UAS operation but who does not have to hold a RPC.⁵¹ A visual observer is subject to the VLOS conditions and must have direct communication with the Remote PIC and any other person manipulating the flight controls.⁵² The Small UAS Rule requires coordination between a visual observer, Remote PIC, and the person operating a small UAS to ensure continuous scanning and awareness of the aircraft and airspace through direct visual observation.⁵³

Other provisions in the rule also relate to see-and-avoid principles and collision avoidance. The rule requires a small UAS to yield the right of way to all other aircraft.⁵⁴ In doing so, a small UAS must give way to the other aircraft and cannot pass over, under, or ahead of the aircraft unless well clear.⁵⁵ Additionally, a small UAS must maintain a distance from any other aircraft that is sufficient to prevent a collision hazard.⁵⁶ The rule prohibits nighttime operation of a small UAS but allows operation during civil twilight with specified anti-collision lighting.⁵⁷ The minimum flight visibility required for operation is three miles, determined from the location of the small UAS controls.⁵⁸ A small UAS must be no less than 500 feet below and 2,000 feet horizontally from clouds.⁵⁹

***398 2. Contain and Control Provisions**

The Small UAS Rule includes several other restrictions intended to contain the area of operation to address the risk that a Remote PIC could lose the direct connection with a small UAS. The rule establishes a vertical boundary for a small UAS flight by limiting flight altitude to 400 feet above ground level, except when a small UAS is within a 400-foot radius of a structure and doesn't fly higher than 400 feet above the structure's highest point.⁶⁰ Horizontal boundaries arise with the VLOS requirement and prohibitions against operating a small UAS from a moving aircraft, although the rule

allows operation from a moving land or water vehicle if over a sparsely populated area.⁶¹ The rule aims to mitigate the risks of losing positive control of a small UAS within its contained area of operation by limiting small UAS speed to 100 miles per hour,⁶² prohibiting a person from operating the controls of, or serving as a Remote PIC or visual observer for, more than one small UAS at a time,⁶³ and not allowing flights of a small UAS over people who are not under the cover of a structure or vehicle unless the people are participating in the aircraft's operation.⁶⁴

3. Flight Area Restrictions

The Small UAS Rule allows small UAS flights in Class G's uncontrolled airspace, while flights under the control of an Air Traffic Control facility--Class B, Class C, Class D, and certain Class E airspace--require permission from the appropriate Air Traffic Control prior to flight.⁶⁵ A small *399 UAS cannot be operated near an airport, heliport, or seaplane base in a way that interferes with operations and traffic patterns.⁶⁶ Additionally, the Small UAS Rule incorporates typical flight-area restrictions for small UAS, such as prohibitions against flights in areas identified by the FAA as temporary disaster areas or major sporting events.⁶⁷

4. Hazardous Operation Prohibitions

Careless or reckless operation of a small UAS in a manner that could cause danger for the life or property of another is prohibited by the Small UAS Rule.⁶⁸ A person may not create an undue hazard to people or property by dropping an object from a small UAS⁶⁹ and cannot use a small UAS to transport hazardous materials.⁷⁰ The rule prohibits manipulating small UAS flight controls or acting as a Remote PIC, visual observer, or participant in small UAS operations with the knowledge of a mental or physical condition that could interfere with the safe operation of the small UAS⁷¹ or while under the influence of drugs or alcohol.⁷²

E. The Waiver Process

The FAA decided to add a waiver process to the Small UAS Rule to address the possibility of emerging new technologies that could alleviate some of the risk concerns underlying the Small UAS Rule and to recognize *400 unique operating conditions for some small UAS applications.⁷³ The waiver mechanism allows a small UAS operation to deviate from operational restrictions in the rule if the FAA finds that the proposed operation can be safely conducted.⁷⁴ An applicant may request a waiver from nine sections of the rule: VLOS; visual observer; operation from a moving aircraft or vehicle; daylight operation; operation of multiple aircraft; yielding the right of way; operation over people; operation in airspace other than Class G airspace; and limitations on speed, altitude, visibility, and cloud distance.⁷⁵

A person requesting a certificate of waiver must complete an online application that describes the proposed operation and justifies that the operation can be safely conducted under the terms of the waiver.⁷⁶ The FAA may place additional restrictions in the certificate of waiver.⁷⁷ If issued, a certificate of waiver requires the operator to deviate as stated in the waiver and in accordance with conditions and limitations.⁷⁸

III. STATE LAWS AFFECTING UAS AND AGRICULTURE

The Small UAS Rule offers a federal regulatory framework for managing the safety risks of UAS flights in the national airspace, but intensified UAS activity also requires attention to other legal issues such as potential infringements on privacy rights, conflicts between private and public rights to airspace, and use of UAS for unlawful or harmful activities.

Since 2013, state lawmakers have introduced hundreds of bills and resolutions, with every state except Colorado enacting one or multiple laws or resolutions regarding UAS.⁷⁹

Federal preemption is a frequent point of debate in matters concerning our country's navigable airspace, and state legislative activity on UAS adds new complexities to the discussion.⁸⁰ Courts have consistently looked to *401 federal aviation laws as indicators of congressional intent to occupy the entire field of aviation safety.⁸¹ Some argue that unmanned aircraft regulation fits squarely within the field of “aviation safety,”⁸² including the FAA's Office of the Chief Counsel, which provided guidance on state and local authority to regulate UAS in the midst of heightened state UAS legislative activity in 2015.⁸³ The guidance described the federal regulatory framework for UAS and cautioned state and local governments against attempting to regulate the operation of UAS in a way that would create fractionalized control of the navigable airspace.⁸⁴ The FAA also explained that UAS issues related to surveillance and search warrants, voyeurism, harassment of hunters and fishermen, and weaponizing UAS are not subject to federal regulation because they relate to state and local police power.⁸⁵

The U.S. Senate attempted to codify federal preemption for UAS regulation with specific language in the FAA Extension, Safety and Security Act of 2016.⁸⁶ The Senate's language clarified that state and local governments would not be limited in their authority to create and enforce laws relating to “nuisance, voyeurism, privacy, data security, harassment, reckless endangerment, wrongful death, personal injury, property damage, or other illegal acts” arising from the use of UAS.⁸⁷ However, Congress did not include the Senate's preemption language in the final version of the law,⁸⁸ despite concerns from the UAS industry that a patchwork of state and local laws could hamper UAS development.⁸⁹ Such interests assert that, at some point in the *402 near future, there will be preemption challenges to state and local UAS laws that aren't clear extensions of state and local police powers.⁹⁰

Many of the new state laws for UAS that may affect agriculture provide remedies for contending with potentially harmful UAS impacts such as privacy interference, harassment, and trespass--issues that we can easily classify as extensions of state police power. But a handful of states have enacted legislation that arguably strays into the realm of aviation safety; actions that may lead to preemption challenges. In the following, we discuss laws that establish state regulatory programs for commercial UAS operators and state laws that address important concerns for agriculture--privacy, harassment, and trespass.

A. State UAS Regulatory Programs

Louisiana and North Carolina have enacted state UAS operating requirements, two laws that appear to collide with the FAA's charge to regulate the field of “aviation safety.”⁹¹ To date, however, neither state law is the source of a federal preemption challenge. Notably, Louisiana's law affects only commercial agricultural UAS operators,⁹² while North Carolina's operating requirements apply to all commercial and governmental UAS users.⁹³

In 2015, Louisiana's legislature directed its Department of Agriculture and Forestry (LDAF) to establish a registration and licensing process for agricultural commercial operations using UAS.⁹⁴ The law evolved a year before the FAA proposed its Small UAS Rule and a year after the Louisiana legislature tasked a stakeholder group to study the use of UAS for agricultural purposes and recommend actions or legislation.⁹⁵ A provision allowing agricultural commercial operators who obtain a license to use UAS over *403 their properties⁹⁶ is of questionable value in the wake of the Small UAS Rule.⁹⁷ Additional provisions in the law require license applicants to complete a safety training course⁹⁸ and authorize LDAF to prohibit violators from continued UAS operations.⁹⁹ LDAF filed its proposed regulations for

agricultural commercial operation of UAS in February of 2016,¹⁰⁰ but the regulations are not yet final as of the date of this publication, likely due to the intervening finalization of the Small UAS Rule.

North Carolina's 2015 law established a state UAS permit process for commercial and governmental UAS operators that is currently in effect.¹⁰¹ UAS permit applicants must be at least 16 years old, hold a valid driver's license, and pass the state's own UAS knowledge test;¹⁰² prerequisites that duplicate the now effective Small UAS Rule. Given the state's explanation of a "commercial operator" as one who uses UAS technology for business purposes, agricultural businesses using UAS are subject to North Carolina's permit requirement.¹⁰³ Permitted commercial operators must agree to terms and conditions that include holding appropriate authorization from the FAA for UAS operations; abiding by all federal, state, and local laws; and assuming all risks and liabilities associated with UAS operation.¹⁰⁴

***404 B. State Privacy and Surveillance Laws**

1. Federal Background

A major issue surrounding the rise of UAS has been the technology's potential impact on the privacy rights and security of citizens and landowners throughout the United States.¹⁰⁵ Small, affordable UAS with fairly sophisticated cameras provide an easy way to covertly view and capture images and data of people and property. The technology can raise fears of privacy invasions, such as those reported by citizens who believe they will suffer a loss of privacy if agencies use UAS for criminal investigations.¹⁰⁶

While the FAA recognizes that UAS pose a new set of challenges over privacy rights, the agency determined that it lacked authority to address privacy within the Small UAS Rule.¹⁰⁷ As an alternative, President Obama ordered federal departments and agencies in 2015 to take steps to safeguard privacy, civil rights, and civil liberties in the face of UAS integration into *405 the national airspace.¹⁰⁸ The President's memorandum also established a multi-stakeholder, public-private process to develop best practices for privacy, accountability, and transparency issues associated with UAS use in the national airspace.¹⁰⁹ The stakeholder process yielded a report in 2016 of recommended best practices for commercial, non-commercial, and news-reporting users of UAS,¹¹⁰ while noting that the practices would not replace or take precedence over any local, state, or federal laws.¹¹¹

In Congress, Senator Rand Paul unsuccessfully advocated legislation as early as 2012 to circumscribe governmental UAS intrusion into the private affairs of citizens.¹¹² Senator Edward J. Markey has proposed the Drone Aircraft Privacy and Transparency Act without success four times since 2012.¹¹³ The proposed legislation would direct the FAA to identify threats to privacy from UAS, require data collection statements from licensed UAS operators, make UAS certificates and licenses available in a searchable format on FAA's website, instill privacy protections for law enforcement and intelligence use of UAS, and provide civil remedies for prohibited acts.¹¹⁴

***406 2. State Approaches to Privacy and Surveillance**

Given growing apprehensions about UAS and privacy, and the limited federal role in confronting such concerns, many states hastened to devise parameters for UAS surveillance activities and provide remedies for privacy invasions.¹¹⁵ A common thread of debate over privacy legislation in the states has been whether the Fourth Amendment¹¹⁶ or the traditional tort laws of false light, appropriation, intrusion of seclusion, and public disclosure of private facts¹¹⁷ already

provide adequate remedies for UAS privacy situations. In spite of potential duplication with existing legal remedies, nearly half of the states have enacted legislation that provides specific privacy protections from UAS activities.¹¹⁸

A number of “Freedom from Unwarranted Surveillance” acts modelled after Senator Paul's federal proposals began trending the states in 2013, and several states enacted the law in some form.¹¹⁹ Three approaches emerge from these laws: (1) establishing new civil and criminal actions for unauthorized governmental or private surveillance activities; (2) prohibiting surveillance of critical infrastructure; and (3) instituting policies and procedures for law enforcement and other governmental users planning to conduct searches and gather evidence with UAS. While recognizing that governmental *407 surveillance activities and threats to critical infrastructure are important issues, we summarize below only the laws that address unauthorized UAS surveillance by civilians because they most directly relate to surveillance and privacy concerns for farms and ranches. Within our identified subset of laws, we decline to discuss laws that relate to voyeurism as those would not likely apply to agricultural situations.

3. Approaches that Target Surveillance of Agricultural Property

Idaho's Preserving Freedom from Unwanted Surveillance Act¹²⁰ is the only state law that specifically includes farms, ranches, and the agricultural industry within the scope of its surveillance protection.¹²¹ The law states that no person, entity, or state agency shall use a UAS to photograph or record a person without that person's consent and shall not, absent a search warrant, use a UAS to:

“... intentionally conduct surveillance of, gather evidence or collect information about, or photographically or electronically record specifically targeted persons or specifically targeted private property including, but not limited to:

- i. An individual or a dwelling owned by an individual and such dwelling's curtilage, without such individual's written consent;

- ii. A farm, dairy, ranch or other agricultural industry without the written consent of the owner of such farm, dairy, ranch or other agricultural industry.”¹²²

The statute creates a civil cause of action for a person who is the subject of the prohibited UAS conduct and entitles the person to at least \$1,000 or actual damages plus attorney fees and litigation costs.¹²³ Legislators in New Mexico and Missouri unsuccessfully proposed laws similar to Idaho's restriction against UAS surveillance of agricultural settings.¹²⁴

The introduced version of an unsuccessful 2013 bill in North Carolina¹²⁵ contained a prohibition regarding agricultural surveillance but the *408 House Judiciary Committee substituted the bill's application to “farms, ranches, and agricultural industry” with a broad reference to “private real property.”¹²⁶

4. Reasonable Expectation of Privacy Approaches

In its Freedom from Unwarranted Surveillance Act,¹²⁷ Florida codified a “reasonable expectation of privacy test”¹²⁸ for UAS surveillance conducted by any person, state agency, or political subdivision.¹²⁹ UAS surveillance of private

property or a person on private property in violation of the person's "reasonable expectation of privacy" is prohibited.¹³⁰ The statute explains that a person is presumed to have a reasonable expectation of privacy on his or her privately owned real property if "he or she is not observable by persons located at ground level in a place where they have a legal right to be, regardless of whether he or she is observable from the air with the use of a drone."¹³¹ An injured party may initiate a civil action for injunctive relief or compensatory damages, including attorney fees, and may also seek punitive damages.¹³² Michigan, South Dakota, and Utah have also adopted a "reasonable expectation of privacy" approach for circumscribing UAS surveillance. Michigan's 2016 law prohibits intentional capture of photographs, video, or audio recordings by UAS in a manner that would invade a person's reasonable expectation of privacy.¹³³ Violation can lead to criminal misdemeanor charges.¹³⁴ In its 2017 legislation, South Dakota amended its statute that prohibits trespassing with intent to eavesdrop.¹³⁵ The amendment established misdemeanor penalties for intentionally using a drone to photograph, record, or otherwise observe another person in a "private place" where the person has a "reasonable expectation of privacy" or landing a drone on the lands or ***409** waters of another resident without the owner's consent.¹³⁶ Unlike Florida, neither Michigan nor South Dakota's law provides guidance for determining when a "reasonable expectation of privacy" exists. Utah devised a slightly different approach when it amended its privacy violation offense to include a prohibition against using a device to observe or photograph a person in a private place where the person may reasonably expect to be safe from casual or hostile intrusion or surveillance.¹³⁷ Both South Dakota and Utah exempt persons operating UAS in compliance with FAA regulations for commercial, educational, or agricultural purposes from privacy offenses.¹³⁸

5. Other State Approaches to Privacy and Surveillance

The North Carolina Legislature successfully added UAS surveillance protection language and other UAS provisions to North Carolina's Appropriations Act of 2014.¹³⁹ With certain exceptions for law enforcement, newsgathering, or general public events, North Carolina's law states that no person, entity, or State agency shall use a UAS to:

1) Conduct surveillance of:

- a) A person or a dwelling occupied by a person and that dwelling's curtilage without the person's consent.
- b) Private real property without the consent of the owner, easement holder, or lessee of the property.

2) Photograph an individual, without the individual's consent, for the purpose of publishing or otherwise publicly disseminating the photo-graph.¹⁴⁰

As with Idaho's law, North Carolina affords aggrieved parties a civil cause of action that may include damages, attorney fees, and injunctive relief, including recovery of \$5,000 for each photograph or video published or disseminated.¹⁴¹

Tennessee's General Assembly passed its Freedom from Unwarranted Surveillance Act in 2013¹⁴² and, within a year, passed a second and more ***410** comprehensive bill that establishes misdemeanor criminal offenses for any person who uses a UAS to capture images of individuals or privately owned real property with the intent to conduct surveillance

on the individual or property.¹⁴³ A person who possesses, displays, or distributes images captured by an unauthorized surveillance is subject to criminal misdemeanor charges, but the law provides a defense if the person destroys or stops displaying images upon gaining knowledge that the images were captured un-lawfully.¹⁴⁴

Although titled differently than similar laws, the Texas Privacy Act,¹⁴⁵ adopted in 2013, also establishes a criminal offense for illegal use of a UAS to capture images of an individual or private property with the intent to conduct surveillance.¹⁴⁶ Texas couples the criminal offense with considerable civil remedies. An owner or tenant of property may seek injunctive relief or damages against a person who illegally captures images of the property, the owner, or a tenant on the property.¹⁴⁷ Damage awards are \$5,000 for images captured in an unauthorized surveillance and \$10,000 for disclosure, display, or distribution of the images, plus actual damages if a person disseminates images with malice.¹⁴⁸

Louisiana addressed UAS surveillance by amending its criminal trespass statute in 2016. The Legislature established a criminal trespass offense for the unauthorized operation of a UAS “in the air space over immovable property owned by another with the intent to conduct surveillance of the property or of any individual lawfully on the property.”¹⁴⁹ The law excludes the operation of a UAS in compliance with federal law or FAA regulations.¹⁵⁰ Violation of the statute can result in fines and imprisonment.¹⁵¹

*411 C. State UAS Harassment Laws

Concerns over UAS as mechanisms for harassment activities arose quickly when animal-rights organizations began encouraging the use of UAS to identify individuals in the act of violating hunting laws and regulations.¹⁵² Outdoorsmen claimed the actual purpose of such efforts was to impede hunting activities and intentionally harass hunters engaged in lawful hunting.¹⁵³ Several states responded by creating criminal offenses for using a UAS to interfere with lawful hunting, fishing, or trapping.¹⁵⁴ Similar concerns about UAS harassment have emerged in the agricultural community.

In addition to the potential of using UAS to harass agricultural producers who raise animals or use certain production practices, producers also face harm to livestock resulting from general pranks that involve using UAS to chase or frighten livestock in open fields.¹⁵⁵ Utah, the only state to specifically address UAS harassment, established a criminal offense for the use of UAS to harm or intentionally, knowingly, or recklessly chase livestock with the intent of causing distress.¹⁵⁶ A first-time offender who forces displacement of the animals or doesn't cause serious injury or death to the livestock is guilty of a Class B misdemeanor and subject to a \$1,000 fine.¹⁵⁷ A repeat offense causing serious injury or death to livestock, or damaging property in excess of \$1,000, leads to a Class A misdemeanor and a \$2,500 penalty.¹⁵⁸

In 2016, Kansas expanded the definition of harassment in its Protection from Stalking Act to include “any course of conduct carried out through the use of an unmanned aerial system over or near any dwelling, occupied vehicle *412 or other place where one may reasonably expect to be safe from uninvited intrusion or surveillance.”¹⁵⁹ The law offers judicial protection from UAS harassment activities.¹⁶⁰ Michigan's legislature took similar action the same year.¹⁶¹ Its Unmanned Aircraft Systems Act prohibits a person from knowingly and intentionally operating a UAS to subject an individual to harassment.¹⁶² A violation results in misdemeanor charges.¹⁶³

D. State UAS Trespass Laws

UAS technology sets up an inevitable conflict between UAS flight operators and the owners and possessors of property who may believe a UAS is committing a trespass by flying too close to private property. Shortly after the invention

of the airplane, the *ad coelum* doctrine's holding that the owner of land also owned the skies above the land created the possibility of committing trespass when using airspace for aviation.¹⁶⁴ The Air Commerce Act of 1926 diluted the conflict between land and air rights by recognizing a public right of transit through the nation's navigable airspace,¹⁶⁵ set for safety reasons at a minimum height of 1000 feet over populated areas and 500 feet elsewhere.¹⁶⁶ At the same time, courts rejected the breadth of the *ad coelum* doctrine, holding instead that a landowner possesses rights in the air space immediately over the land surface in relation to uses taking place on the land surface, described as “a dominant right of occupancy for purposes incident to his use and enjoyment of the surface”¹⁶⁷ and “at least as much of the space above the ground as [the landowner] can occupy or use in connection with the land.”¹⁶⁸ Accordingly, the extent of a private property owner's rights in airspace varies according to the owner's surface uses.

*413 These historical attempts to separate private property rights and aircraft navigability rights are further muddled by the entrance of UAS into the skies. The Small UAS Rule requires UAS to operate beneath 400 feet, an altitude that could lead to claims of trespass due to alleged interference with an owner's legal right of occupancy in airspace that is “incidental” to the owner's use of the land surface. Perhaps equally relevant is the perception that a trespass is occurring, prompted by the physical presence of UAS at much lower altitudes than property owners experience with other types of aircraft.¹⁶⁹ Such conflicts have driven states to attempt further clarification of the boundary between public navigable airspace and private property,¹⁷⁰ although few have navigated the challenge successfully. As holders of a significant portion of the nation's private lands, agricultural landowners will undoubtedly encounter UAS trespass issues on their properties. Conversely, as primary users of UAS technology, agricultural UAS operators may be subject to trespass claims by other landowners.

Several early laws attempted to establish a minimum elevation for UAS flights. Oregon's 2013 UAS trespass law allows an owner or occupier of property to bring a trespass action against a UAS operator who later repeats a UAS flight at less than 400 feet over the owner or occupier's property after being notified that the owner or occupier does not authorize the flight.¹⁷¹ The Legislature twice amended the law in 2015; first, removing the requirement that the UAS be operating at less than 400 feet¹⁷² and next, disallowing a trespass action against a UAS operated for commercial purposes in compliance with FAA rules.¹⁷³ Nevada passed a nearly identical law in 2015 for flights under 250 feet in elevation.¹⁷⁴ Both states permit a plaintiff to *414 recover treble damages for any injuries resulting from the trespass, in addition to attorney fees.¹⁷⁵

Although California's legislature passed a UAS trespass bill in 2015,¹⁷⁶ Governor Brown vetoed the measure because the law would “expose the occasional hobbyist and the FAA-approved commercial user alike to burdensome litigation and new causes of action.”¹⁷⁷ The bill would have extended liability for wrongful occupation of real property to a person who operates a UAS at an elevation less than 350 feet without express permission.¹⁷⁸

South Dakota failed to enact similar legislation in 2017. The legislation would have prohibited low altitude UAS flights that interfere with existing land and water uses, the space over land and water, or that are imminently dangerous or damaging to a person or property lawfully on the land or water beneath the flight.¹⁷⁹ The legislature removed that provision and instead amended its trespass with intent to eavesdrop statute to prohibit landing a UAS on lands or waters of another resident without the owner's consent; a class one misdemeanor.¹⁸⁰

Utah also employed the criminal trespass approach in its 2017 UAS bill.¹⁸¹ Criminal trespass in Utah now includes causing a UAS to enter and remain unlawfully over property, for which notice against the entering has been given,¹⁸² or entering and remaining unlawfully over property with intent to cause annoyance or injury, with intent to commit

a crime, or with reckless disregard for the fear for safety caused by the UAS.¹⁸³ Violation of the statute can lead to misdemeanor charges.¹⁸⁴

*415 IV. CHALLENGES AND IMPLICATIONS FOR AGRICULTURE

A. The Small UAS Rule

As FAA developed its plan and proposed rule, the agency required operators desiring to fly UAS for commercial, work, or business purposes to seek authorization from the FAA on a case-by-case basis through FMRA's Section 333 process,¹⁸⁵ claimed by many to be burdensome and time consuming.¹⁸⁶ Many applaud the Small UAS Rule for providing greater regulatory certainty than the alternative Section 333 regulatory process, an improvement that will ultimately accelerate UAS technology development.¹⁸⁷ The Small UAS Rule is not without its critics, however. In the agricultural sector, dissatisfaction with the rule centers in three key areas: certification standards, the VLOS requirement, and restrictions on nighttime flying. The rule's waiver provisions may diminish some of these concerns.

In the agricultural arena, we would expect criticism of the Small UAS Rule certification standards to come from those who must meet the standards,¹⁸⁸ but the strongest criticism arises from other users of the zero to 400 foot airspace who claim that the standards are too lenient given the risks of collision presented by small UAS.¹⁸⁹ The agricultural aerial applicator industry,¹⁹⁰ concerned with collision avoidance in shared airspace with UAS, argues that visibility test results indicate that UAS operators should be subject *416 to the more demanding FAA airman certification standards and should be required to pass an actual skills test.¹⁹¹ The FAA responded to these concerns by stating that a more stringent approach would impose significant cost burdens with little corresponding safety benefits.¹⁹²

Additional disapproval of the Small UAS Rule centers on its VLOS restriction. Some claim that maintaining an unassisted line of sight will be difficult for agricultural UAS operators¹⁹³ and will impede the usefulness of UAS technology when used over sizable agricultural acreages.¹⁹⁴ Many argue that UAS technology is capable of safe operation “beyond visual line of sight” (BVLOS) but are willing to accept the FAA's incremental approach to the issue until more UAS possess avoidance protection technology.¹⁹⁵ FAA Administrator Huerta recently suggested that BVLOS regulations would be under development in 2017.¹⁹⁶ For now, the FAA prefers to address VLOS complaints by allowing operators who are hampered by the restriction to seek a waiver of the provision.¹⁹⁷ Congress may choose to direct the issue, *417 however, as indicated by language included in the recently proposed FAA reauthorization bill that would require the FAA to develop regulations for BVLOS flights.¹⁹⁸

The agricultural industry asserts that the Small UAS Rule's daylight-only restriction also hinders the potential benefits of UAS technology for agricultural uses. Many UAS flights over agricultural crops are best conducted at night due to temperatures, weather conditions, or imaging capabilities.¹⁹⁹ In the final rule, the FAA did not eliminate the proposed rule's daylight-only restrictions but did expand the rule to allow operation during “civil twilight” with appropriate lighting.²⁰⁰ Consistent with its handling of other operating restrictions, the FAA proposed the waiver process as the mechanism for accommodating nighttime flight need, stating that the agency would allow a small, nighttime UAS operation “if an applicant can demonstrate sufficient mitigation such that operating at night would not reduce the level of safety of the operation.”²⁰¹

UAS operators have indeed utilized the Small UAS Rule's waiver process. In the rule's first five months, the FAA approved 318 waivers.²⁰² By far, the daylight operation restriction is the most common waiver request, with only 14 of

the 318 requests seeking to waive a provision other than the daylight operation restriction.²⁰³ Nine applications asked the FAA to set aside the restriction on multiple UAS operations, and two requested waivers of the VLOS restriction.²⁰⁴ The visual observer, weather visibility, and operation from a moving vehicle provisions were each the subject of one waiver request.²⁰⁵

***418 B. State Regulation of UAS**

Few states have appeared anxious to implement a state regulatory program for UAS operators since the FAA devised its Small UAS Rule.²⁰⁶ North Carolina's state-level permitting program, enacted prior to the Small UAS Rule, does establish additional steps and a state-based knowledge test for commercial UAS operators who are now also subject to certification by the FAA. Louisiana's regulatory program for commercial agricultural UAS users may have intended to enable UAS operations on farms when originally drafted prior to the Small UAS Rule, but if implemented, the program will duplicate the FAA's Small UAS Rule. Both state laws create regulatory burdens for commercial agricultural UAS operators and contribute to the potential of "fractionalized control of the navigable airspace" against which the FAA warned states that were considering UAS legislation.²⁰⁷ Whether there will be a preemption challenge alleging that the state regulations interfere with the federal government's intent to occupy the entire field of aviation safety is an important question for commercial agricultural UAS users in North Carolina and Louisiana.

Equally important is the question of the utility of UAS surveillance and privacy protection laws for agricultural situations. For farmers and ranchers, UAS technology raises unique privacy and security problems. Animal rights advocates and environmental interests have published threats to use UAS to "pull back the curtain" on the agricultural industry²⁰⁸ and see what is "invisible and hidden" from the public.²⁰⁹ Internet sites already host photographs and videos gathered through UAS surveillance activities.²¹⁰ While some private surveillance might legitimately disclose regulatory violations on farms, it is equally possible that images and data obtained by UAS surveillance could be misrepresented, misused, or misunderstood. As the agricultural community has already experienced, dissemination of skewed or untruthful ***419** information by interests opposed to agriculture can result in negative publicity, sales losses, and personal threats.²¹¹

Only Idaho's law specifically references unauthorized surveillance of farms, ranches, and dairies, but criticism of Idaho's law as another type of "ag-gag"²¹² law that shields farmers from criminal exposure²¹³ raises the possibility of legal challenges. Idaho and several other states enacted ag-gag laws to punish undercover video surveillance of livestock and poultry facilities by animal welfare advocates posing as employees.²¹⁴ Proponents of ag-gag claim that the laws protect farmers from skewed or misleading depictions of farm practices that are obtained unlawfully,²¹⁵ an argument that also applies to UAS surveillance protection laws for farms. A federal district court has struck down Idaho's ag-gag law for violating freedom of speech and equal protection rights based upon the law's intent to "limit and punish" those who would speak out against agriculture and its "animus to animal welfare groups."²¹⁶ Most of the other ag-gag laws face similar constitutional challenges.²¹⁷ Meanwhile, animal welfare advocates have publicly announced ***420** UAS as a tool for side-stepping ag-gag laws,²¹⁸ suggesting the possibility that state laws circumscribing UAS surveillance could also see constitutional challenges. Would a court interpret Idaho's law and its specific reference to farms as another hostile attempt to "limit and punish" those who would speak out against agriculture? An important distinction to note is that Idaho's UAS surveillance law shields all individuals, their dwellings, and their curtilage from UAS surveillance along with its protection of agricultural properties, rather than targeting only agricultural properties.²¹⁹

Other state laws that generally prohibit UAS surveillance of any private real property can apply to farms and ranches that experience unauthorized UAS surveillance. Laws in Florida, Michigan, South Dakota, and Utah include a "reasonable

expectation of privacy” standard for surveillance interferences, which some claim will “inspire a new wave of litigation” for invasion of privacy claims.²²⁰ To utilize such remedies, agriculture would be forced to argue that a reasonable expectation of privacy or a reasonable expectation to be safe from private aircraft surveillance should exist for open agricultural fields, curtilage, and agricultural structures, areas that don't fare well under judicial scrutiny of privacy rights in relation to Fourth Amendment governmental searches.²²¹

Further complications with these UAS surveillance protection laws stem from the nature of UAS surveillance technology. In its landmark *Dow Chemical* decision, the Supreme Court ruled that for purposes of aerial surveillance by governmental agencies, a property owner does not have a reasonable expectation of privacy when ‘publicly available’ technology such as photographic equipment is used to collect images from an aircraft flying at a legal altitude, as opposed to surveillance by highly sophisticated surveillance equipment that is not publicly available.²²² A critical question for purposes of the reasonable expectation of privacy is whether privacy spaces will narrow as UAS technology becomes more common and publicly available. Should this evolution occur, it will logically become more difficult for farmers and ranchers to establish privacy spaces that are safe from UAS surveillance.

Perhaps to combat this possibility, Florida's statute establishes a “ground level” standard of privacy for aerial UAS surveillance,²²³ an approach that conflicts with *Dow Chemical's* allowance of a technologically-driven standard for privacy and governmental searches.²²⁴ For agricultural landowners in Florida, the law could result in an expansive definition of privacy rights, since many agricultural spaces are not easily observable from ground-level places such as a public road. Agricultural landowners under Michigan and South Dakota's laws,²²⁵ which also incorporate a reasonable expectation of privacy standard, may face an aerial standard of privacy that could diminish the value of the statute for prohibiting aerial surveillance of farms and ranches.

Several of the state UAS privacy and surveillance laws include exceptions for claims against persons operating UAS in compliance with FAA regulations for commercial, educational, or agricultural purposes.²²⁶ These exceptions can buffer agricultural UAS operators from privacy or surveillance claims resulting from unintended or accidental surveillance that may occur in the course of conducting UAS operations for agricultural purposes. Conversely, the exceptions could create a loophole by allowing a UAS operator holding Small UAS Rule certification to conduct otherwise prohibited surveillance and be free from privacy claims as long as the operator is in compliance with the Small UAS Rule, which consequently does not include regulations that affect privacy or property rights. Senator Markey's proposed Drone Aircraft Privacy and Transparency Act²²⁷ could alter this scenario. The proposal advocates requiring data-collection statements that establish privacy guidelines for the collection of data and information by UAS operators.²²⁸ An operator who failed to follow the provisions would not be in compliance with FAA and thus could not utilize the exception from the surveillance protection statute.²²⁹

Of the handful of state UAS harassment laws, Utah's livestock harassment statute²³⁰ is most useful for agriculture. While the law criminalizes actions against livestock,²³¹ it doesn't establish clear civil remedies for resulting harm to livestock from UAS harassment. The UAS harassment statutes in Kansas and Michigan could conceivably apply to repeated intrusions of UAS near persons engaged in an agricultural operation, but the required causation of fear or emotional distress as a result of the UAS harassment²³² may limit the law's relevance to all potential harassment activities. Perhaps also applicable to potential agricultural situations would be laws modeled after UAS hunter harassment statutes, which penalize UAS operations that attempt to impede or interfere with lawful activities.²³³

Surprisingly, only a few states have enacted UAS trespass laws. Of those, Nevada's setting of a 250-foot elevation boundary²³⁴ establishes a new class of airspace for UAS navigation in the space between 250 feet and the FAA's

maximum elevation of 400 feet for UAS users.²³⁵ It also gives landowners a well-defined legal right to exclude unauthorized UAS from the resulting “private” airspace. Governor Brown's rejection of California's proposed 350-foot elevation for creating burdensome litigation and new causes of action²³⁶ fails to recognize that such an approach simplifies the case-by-case determination of airspace rights employed for existing trespass claims, in which the court must establish the extent of airspace that is “incident to [a landowner's] use and enjoyment of the surface.”²³⁷

Both Nevada and Oregon's trespass laws apply only to UAS flights repeated after a landowner previously gave notice that a UAS flight was not authorized.²³⁸ This requirement may diminish the law's effectiveness for agricultural landowners, who must be prepared to establish property boundaries that are discernable to UAS operators, identify unauthorized UAS, and provide notice to the unauthorized UAS operators. Technological tools such as “geofencing” and “airmapping” can alert a UAS operator to “restricted” airspace, but such tools must be incorporated into the operating UAS's *423 software and currently only notify UAS operators of government-restricted airspace such as airport zones.²³⁹ Agricultural landowners will need to stay abreast of advancements in technology that could allow a landowner to alert a UAS of private property boundaries.

A pressing concern for agricultural landowners not addressed in any state or federal laws regards threats to agricultural security. Much attention is given to the benefits UAS offer for agriculture, but it is equally plausible that UAS could intentionally harm agriculture and food supplies. Concerns about “weaponizing” UAS highlight the possibility of misuse of UAS in destructive ways,²⁴⁰ apprehensions that can also apply to the agricultural production setting. For agricultural operators and food consumers, harmful actions could include introducing pests, disease, or bacteria to destroy or infect crops or livestock. Considerable deliberation would be required for developing legislative strategies to minimize such risks, but efforts to prohibit UAS flights over “critical infrastructure” such as electric, transportation, and energy systems provide a model.²⁴¹ Could agricultural systems fall within the category of “critical infrastructure” that warrants legislative protection? Given that agricultural products meet basic human needs, a strong argument exists for special protection of agriculture from potentially destructive UAS activities.

V. CONCLUSION

Agricultural landowners and operators will undoubtedly gain from UAS technology and the improvements it offers for agricultural production. Now that the FAA has finalized the Small UAS Rule, agricultural operators using UAS for commercial purposes will benefit from more efficient regulatory oversight intended to ensure safety while integrating UAS into the nation's airspace. Shortfalls in the Small UAS Rule exist for agriculture, but some issues such as restrictions on nighttime flights can be resolved through the rule's waiver process. Other concerns, such as the rule's visual line of sight provisions, suggest needs for future legislative or regulatory revisions. An additional burden for UAS users in North Carolina, and possibly Louisiana, is a duplicative oversight process at the state level that may violate the federal government's authority over airspace safety.

*424 Other state laws regarding UAS operations may help agriculture navigate the privacy, harassment, and property rights issues posed by UAS. Several states have attempted to circumscribe UAS surveillance activities that can interfere with privacy rights of farmers, ranchers, and other persons. These laws may provide civil and criminal remedies when agriculture suffers harm from misinformation based upon UAS surveillance activities. Several states have also developed legislative solutions for delineating private property rights from UAS airspace navigation rights. Trespass statutes may reduce UAS interferences with agricultural property and also offer remedial measures for farmers and ranchers. Absent from any legislative discussions, however, is the possibility of “terrorism” type UAS activities that could destroy or disease agricultural products and threaten the security of agricultural operations and consumers of agricultural products. The evolution of UAS technology and its use in agriculture should continue with an eye toward addressing the legal landscape UAS creates for agricultural landowners and operators.

Footnotes

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- 1 See, e.g., Sean Hogan et al., *Unmanned Aerial Systems for Agriculture and Natural Resources*, 71 CAL. AGRIC. 5, 5-6 (2017). The authors explain that, in the past decade, technology has improved UAS flight longevity, reliability, ease of use, and utilization of cameras and sensors. *Id.* at 5.
- 2 FED. AVIATION ADMIN., FAA AEROSPACE FORECAST FISCAL YEARS 2016-2036 31 (2016) [hereinafter FORECAST]. The forecast shows a quadrupling of sales in the year following implementation of the new FAA rule for small UAS. The 2016 forecast is 600,000 small UAS; the number jumps to 2.5 million in 2017. *Id.* at 31.
- 3 *Id.* at 33.
- 4 DARRYL JENKINS & DR. BIJAN VASIGH, *THE ECONOMIC IMPACT OF UNMANNED AIRCRAFT SYSTEMS INTEGRATION IN THE UNITED STATES* 6 (2013).
- 5 Lauren Manning, *What do the New FAA Regulations Actually Mean for Ag Drone Startups?*, AGFUNDER NEWS (July 1, 2016), <https://agfundernews.com/what-do-the-new-faa-regulations-actually-mean-for-ag-drone-startups.html>. “It will be the fastest growing segment of commercialized drones,” says [AgEagle’s Tom] Nichol. “We think every farm will not only have one but maybe two drones. A fixed wing to fly a lot of acreage and a rotary to spot check cattle, water systems, and other things.” *Id.*
- 6 Federal Aviation Administration Modernization and Reform Act of 2012, Pub. L. No. 112-95, 126 Stat. 11 (codified at 49 U.S.C. § 40101 note) [hereinafter FMRA]. For thorough reviews of the history of FAA’s regulation of UAS prior to the Small UAS Rule, see Douglas Marshall, “*What a Long Strange Trip It’s Been*”: *A Journey Through the FAA’s Drone Policies and Regulations*, 65 DEPAUL L. REV. 123 (2015); Joshua Kohler, Note, *The Sky is the Limit: FAA Regulations and the Future of Drones*, 15 COLO. TECH. L. J. 151 (2017).
- 7 *Busting Myths about the FAA and Unmanned Aircraft*, FED. AVIATION ADMIN., <https://www.faa.gov/news/updates/?newsId=76240> (last modified Mar. 07, 2014). The FAA also stated that a user may not fly a UAS for commercial purposes by following the guidelines for model aircraft flown for recreational purposes (below 400 feet, 3 miles from an airport, away from populated areas) because Congress exempted model aircraft from regulations in FMRA. This distinction between “flying for work” and “flying for fun” was understandably difficult for those seeking to use UAS for agricultural purposes to conduct flights that appeared remarkably similar to recreational flights of model aircraft.
- 8 *Operation and Certification of Small Unmanned Aircraft Systems*, 81 Fed. Reg. 42064, 42069-70 (June 28, 2016) (codified at 14 C.F.R. § 107).
- 9 *Id.*
- 10 Stateline, *States Issue Their Own Drone Rules*, GOVERNING MAG. (Sept. 14, 2015), <http://www.governing.com/topics/public-justice-safety/states-rush-to-regulate-drones-ahead-of-federal-guidelines2.html>.
- 11 See *Current Unmanned Aircraft State Law Landscape*, NAT’L CONF. STATE LEG. (NCSL) (Nov. 30, 2017), <http://www.ncsl.org/research/transportation/current-unmanned-aircraft-state-law-landscape.aspx> [hereinafter NCSL]. NCSL has compiled year-by-year reports on UAS legislation since 2013 and also provides a report with all UAS legislation and federal law and policy on UAS. See Amanda Essex, *Taking Off: State Unmanned Aircraft Systems Policies*, NAT’L CONF. STATE LEG. (2016), http://www.ncsl.org/Portals/1/Documents/transportation/TAKING_OFF-STATE_%20UNMANNED_%20AIRCRAFT_SYSTEMS_%20POLICIES_%20%28004%29.pdf.
- 12 FMRA, *supra* note 6.

- 13 *Id.* Section 332(a)(2) of FMRA required that the comprehensive plan for UAS integration include nine components, the first concerning rulemaking. The rulemaking recommendations were to define acceptable standards for operation and certification of UAS; standards and requirements for operators and pilots of UAS, including registration and licensing; and were to ensure that UAS include sense and avoid capabilities. Congress set September 30, 2015 as the date by which the plan should provide for the safe integration of civil UAS. Section 332(b) directed that a final rule to allow for civil operation of UAS and to implement the plan required by Section 332(a) be published no later than 18 months after completion of the plan.
- 14 [Operation and Certification of Small Unmanned Aircraft Systems](#), 81 Fed. Reg. 42064, 42066 (June 28, 2016) (codified at 14 C.F.R. § 107). In the rule, the FAA explains that the new framework allows small UAS operations without requiring airworthiness certification, an exemption or a Certificate of Authorization from the FAA.
- 15 *Id.* See generally Comments to [Operation and Certification of Small Unmanned Aircraft Systems](#), REGULATIONS.GOV, <https://www.regulations.gov/docket?D=FAA-2015-0150> (last visited Dec. 28, 2017).
- 16 See 14 C.F.R. § 107.3 (2017) (defining a small unmanned aircraft as “an unmanned aircraft weighing less than 55 pounds on takeoff, including everything that is on board or otherwise attached to the aircraft.”); *Id.* (“small unmanned aircraft system (small UAS) means a small unmanned aircraft and its associated elements (including communication links and the components that control the small unmanned aircraft) that are required for the safe and efficient operation of the small unmanned aircraft in the national airspace system.”). See generally 14 C.F.R. § 101 (2017). The Small UAS Rule does not apply to unmanned aircraft regulated by 14 C.F.R. § 101, which includes model aircraft flown for recreational or hobby purposes, moored balloons, kits, amateur rockets, and unmanned free balloons.
- 17 14 C.F.R. § 107.12 (2017). An exception exists for international operators. The Small UAS Rule allows the FAA Administrator to authorize an airman without a RPC to operate a civil foreign-registered small UAS, consistent with international standards. *Id.* The FAA notes, however, that global remote pilot standards do not yet exist, so non-U.S. citizens must currently obtain an FAA-issued RPC through the foreign air carrier licensing process contained in 14 C.F.R. § 375. See *Unmanned Aircraft Systems (UAS) Frequently Asked Questions*, FED. AVIATION ADMIN, <https://www.faa.gov/uas/faqs/> (last modified July 11, 2017) [hereinafter *UAS FAQs*].
- 18 14 C.F.R. § 107.61 (2017). The rule provides that for safety reasons, the FAA may place operating restrictions on a person who cannot meet one of the English language requirements because of medical reasons. *Id.*
- 19 *Id.* Applicants who possess a current pilot certificate, other than a student pilot certificate, may complete the required “Part 107 small Unmanned Aircraft Systems (sUAS) ALC-451” online training course. See *Part 107 Small UAS Course Introduction*, FED. AVIATION ADMIN., https://www.faasafety.gov/gslac/ALC/course_content.aspx?cID=451&sID=726&crID=1437198 (last visited Dec. 28, 2017).
- 20 14 C.F.R. § 107.7 (2017). According to the FAA, Knowledge Testing Centers charge applicants approximately \$150 to take the test. See *UAS FAQs*, *supra* note 17.
- 21 *Id.* For more detail on the knowledge standards expected for certification, see FED. AVIATION ADMIN., REMOTE PILOT KNOWLEDGE TEST GUIDE (2017), https://www.faa.gov/training_testing/testing/test_guides/media/remote_pilot_ktg.pdf [hereinafter TEST GUIDE].
- 22 TEST GUIDE, *supra* note 21, at 2.
- 23 14 C.F.R. § 107.71 (2017).
- 24 14 C.F.R. § 107.63 (2017). The application is the FAA Airman Certificate and/or Rating Application, FAA Form 8710-13.
- 25 See *Integrated Airman Certification and Rating Application (IACRA)*, FED. AVIATION ADMIN., <https://iacra.faa.gov/> IACRA (last visited Dec. 28, 2017).
- 26 The FAA reports that processing time is longer for paper applications and those who use the paper application do not have the option of receiving a temporary RPC as provided through the online IACRA system. See *Becoming a Pilot*, FED. AVIATION ADMIN., https://www.faa.gov/uas/getting_started/fly_for_work_business/becoming_a_pilot/ (last modified Feb. 10, 2017).

- 27 U.S. DEPT. OF HOMELAND SECURITY, PRIVACY IMPACT ASSESSMENT UPDATE FOR THE AIRMEN CERTIFICATION VETTING PROGRAM 2 (2016).
- 28 FED. AVIATION ADMIN., ADVISORY CIRCULAR 107-2, SMALL UNMANNED AIRCRAFT SYSTEMS at 6-2 (2016) [hereinafter FAA ADVISORY CIRCULAR]. A temporary RPC is valid for 120 calendar days. 14 C.F.R. § 107.64 (2017). The FAA states that applications through IACRA should be validated within ten days. See *UAS FAQs*, *supra* note 17.
- 29 FAA ADVISORY CIRCULAR, *supra* note 28, at 6.5.
- 30 49 C.F.R. § 1515.5 (2017) and 40 C.F.R. § 1515.9 (2017) outline the grounds for appeal and appeals process for an Initial Determination of Threat Assessment.
- 31 14 C.F.R. § 107.65 (2017).
- 32 Operation and Certification of Small Unmanned Aircraft Systems, 80 Fed. Reg. 9544, 9558 (proposed Feb. 23, 2015). In the Notice of Proposed Rulemaking, the FAA sought comments on whether to establish a pilot in command role for small UAS flights. *Id.*
- 33 Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. 42064, 42099-100 (June 28, 2016) (codified at 14 C.F.R. § 107).
- 34 *Id.*
- 35 14 C.F.R. § 107.19 (2017).
- 36 *Id.*
- 37 14 C.F.R. § 107.21 (2017). The authority to make emergency decisions equates the Remote PIC role with that of pilots in command for other types of aircraft.
- 38 *Id.*
- 39 14 C.F.R. § 107.12 (2017).
- 40 *Id.*
- 41 14 C.F.R. § 107.49 (2017).
- 42 *Id.* The rule specifies that a pre-flight inspection should include assessing risks in the immediate vicinity, such as local weather conditions; airspace and flight restrictions; location of persons, property, and ground hazards; ensuring that persons directly involved in operation of the small UAS are informed of operating conditions, emergency and contingency procedures, roles and responsibilities, and potential hazards; ensuring that control links between the aircraft and ground control are operational; ensuring sufficient power to operate for the intended time period; and ensuring that objects attached to or carried by the small UAS are secure and will not adversely affect flight characteristics or controllability of the aircraft. *Id.* Another section of the Small UAS Rule reiterates the importance of inspection, stating that a Remote PIC must check the small UAS to determine whether it is in a condition for safe operation. 14 C.F.R. § 107.15 (2017). The FAA advises the Remote PIC to conduct a preflight inspection in accordance with the small UAS manufacturer's owner or maintenance manual. See FAA ADVISORY CIRCULAR, *supra* note 28, at 7-2.
- 43 14 C.F.R. § 107.9 (2017). In regards to property damage, the rule specifies that the \$500 property damage amount includes materials and labor for repairs or is based upon the fair market value of a property. The FAA provides an online portal for accident reporting at *Report an Accident*, FED. AVIATION ADMIN., https://www.faa.gov/uas/report_accident/ (last modified Aug. 25, 2016). Alternatively, accident reports may be directed to the nearest FAA Flight Standards District Office. *Id.*

- 44 14 C.F.R. § 107.13 (2017) (referring to registration requirements in 14 C.F.R. § 91.203(a)(2) (2017)). Note that the D.C. Circuit Court of Appeals recently held that the FAA does not have the legal authority to require registration for recreational UAS operators. *See Taylor v. Huerta*, 856 F.3d 1089 (D.C. Cir. 2017).
- 45 14 C.F.R. § 107.15(b) (2017).
- 46 *Id.*
- 47 14 C.F.R. § 107.7(b) (2017).
- 48 14 C.F.R. § 107.31 (2017).
- 49 *Id.*
- 50 14 C.F.R. § 107.33.
- 51 Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. 42064, 42099-100 (June 28, 2016) (codified at 14 C.F.R. § 107).
- 52 *Id.* The Small UAS Rule charges the Remote PIC with ensuring that the visual observer meets the VLOS provisions. *Id.*
- 53 *Id.*
- 54 14 C.F.R. § 107.37 (2017) (stating that a small UAS must yield the right of way to “all aircraft, airborne vehicles, and launch and reentry vehicles).
- 55 *Id.* § 107.37(a).
- 56 *Id.* § 107.37(b).
- 57 14 C.F.R. § 107.29 (2017). “Civil twilight” refers to 30 minutes before and after official sunrise and sunset, except in Alaska, where civil twilight is defined by the Dept. of Defense’s Air Almanac. *Id.* Anti-collision lighting must be visible for at least three statute miles, but the Remote PIC may alter the lighting intensity in the interest of safety. *Id.* § 107.29 (c).
- 58 14 C.F.R. § 107.51(c) (2017). “Flight visibility” is the “average slant distance from the control station at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night.” *Id.* A person must be able to see the diagonal distance of three miles into the sky in order to detect other aircraft that may be approaching and maintain sight of the small UAS. Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. at 42107.
- 59 14 C.F.R. § 107.51(d) (2017). Cloud clearance provisions attempt to address the speed differential between manned and unmanned aircraft so that a small UAS can respond at its lesser speed to avoid a manned aircraft exiting from clouds at a higher speed. Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. at 42106.
- 60 14 C.F.R. § 107.51 (2017). The proposed rule established a flight ceiling of 500 feet, lowered to 400 feet in the final rule after the FAA considered comments by groups such as the National Agricultural Aviation Association (whose members conduct aerial applications of pesticides, herbicides, and other crop protection products). The comments asked the FAA to increase the buffer zone between manned and unmanned aircraft to further prevent collision risk. Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. at 42116-118.
- 61 14 C.F.R. § 107.25 (2017). The FAA explains that the term “sparsely populated area” will be determined on a case-by-case basis, but points to *Mickalich v. United States*, No. 05-72276, 2007 WL 1041202, at *9-11 (E.D. Mich. Apr. 5, 2007) for its determination that twenty people on a ten-acre site constitutes sparsely populated as that term is used in FAA general operating and flight rules in 14 C.F.R. § 91.119 (2017). Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. at 42115. *Mickalich* suggests that many agricultural areas would likely qualify as “sparsely populated.” 2007 WL 1041202 at *11.
- 62 14 C.F.R. § 107.51 (2017).

- 63 14 C.F.R. § 107.35 (2017).
- 64 14 C.F.R. § 107.39 (2017).
- 65 14 C.F.R. § 107.41 (2017). The rule does not expressly permit small UAS flights in Class G airspace but allows the flights by omission when stating that flights in other airspace require permission. The FAA defines Class G airspace as that portion of airspace that has not been designated as Class A, Class B, Class D, or Class E airspace. FED. AVIATION ADMIN., AERONAUTICAL INFORMATION MANUAL 139 (2017), https://www.faa.gov/air_traffic/publications/media/AIM_Basic_dtd_10-12-17.pdf. FAA relies on its Aeronautical Knowledge Test to guide operators in determining airspace classifications and developed its B4UFLY app to help UAS flyers know if they are in controlled airspace. A request to fly in controlled airspace may only be made through an online portal at https://www.faa.gov/uas/request_waiver/. See *UAS FAQs*, *supra* note 17.
- 66 14 C.F.R. § 107.43 (2017).
- 67 14 C.F.R. § 107.45 (2017). The provision requires compliance with 14 C.F.R. §§ 91.137-145, which also prohibits flights in the vicinity of public figures such as the President of the United States, near space flight operations, or in areas declared by FAA as emergency or aerial flight demonstration areas. 14 C.F.R. § 107.45 (2017).
- 68 14 C.F.R. § 107.23 (2017).
- 69 *Id.*
- 70 14 C.F.R. § 107.36 (2017). The Small UAS Rule references transportation regulations in 49 C.F.R. § 171.8 (2017) for the definition of hazardous material. *Operation and Certification of Small Unmanned Aircraft Systems*, 81 Fed. Reg. 42064, 42064 (June 28, 2016) (codified at 14 C.F.R. § 107).
- 71 14 C.F.R. § 107.17 (2017).
- 72 14 C.F.R. § 107.27 (requiring compliance with FAA's general operating and flight rules for aircraft in 14 C.F.R. §§ 91.17-19 (2017)).
- 73 *Operation and Certification of Small Unmanned Aircraft Systems*, 81 Fed. Reg. at 42071. The proposed rule for Small UAS invited comments on adding a waiver mechanism to accommodate new technologies and unique operational circumstances, to which representatives of agriculture replied that its unique operating environments would call for deviation from the rule's operating limitations. *Id.*
- 74 *Id.* at 40166.
- 75 14 C.F.R. § 107.205 (2017). For waiver requests regarding VLOS and operation from a moving vehicle or aircraft, the FAA will not issue a waiver to allow the carriage of property of another by aircraft for compensation or hire. *Id.*
- 76 14 C.F.R. § 107.200 (2017). The application appears to be available only online at *Request a Part 107 Waiver or Operation in Controlled Airspace*, FED. AVIATION ADMIN., https://www.faa.gov/uas/request_waiver/ (last visited Dec. 28, 2017).
- 77 *Id.*
- 78 *Id.*
- 79 See generally NCSL, *supra* note 11.
- 80 See, e.g., Margot E. Kaminski, *Drone Federalism: Civilian Drones and the Things They Carry*, 4 CAL. L. REV. 57 (2013); Troy A. Rule, *Airspace in an Age of Drones*, 95 B. U. L. REV. 155 (2015); Ray Carver, *State Drone Laws: A Legitimate Answer to State Concerns or a Violation of Federal Sovereignty*, 31 GA. ST. U. L. REV. 377 (2014-2015).
- 81 See *Goodspeed Airport, LLC v. East Haddam Inland Wetlands & Watercourses Comm'n*, 634 F.3d 206, 210 (2d Cir. 2011); *U.S. Airways, Inc. v. O'Donnell*, 627 F.3d 1318, 1326 (10th Cir. 2010); *Montalvo v. Spirit Airlines*, 508 F.3d 464 (9th Cir. 2007).

- 82 Andrew Zimmitti, *A Look at Federal Preemption of State Drone Laws*, LAW 360 (Oct. 25, 2016), <https://www.law360.com/media/articles/854886/a-look-at-federal-preemption-of-state-drone-laws>.
- 83 See FED. AVIATION ADMIN., STATE AND LOCAL REGULATION OF UNMANNED AIRCRAFT SYSTEMS (UAS) FACT SHEET (2015), https://www.faa.gov/uas/resources/uas_regulations_policy/media/UAS_Fact_Sheet_Final.pdf.
- 84 *Id.* at 2.
- 85 *Id.* at 3.
- 86 FAA Extension, Safety and Security Act of 2016, Pub. L. No. 114-190 (proposing preemption of state or political subdivision actions related to design, manufacture, testing, licensing, registration, certification, operation, or maintenance of unmanned aircraft systems).
- 87 H.R. 636, 114th Cong. § 2152 (2015). The Senate's Engrossed Amendment to the bill contained the preemption provisions.
- 88 *Id.* The House amendments to the Senate's amended version of the bill removed the preemption sections along with several other sections of the Senate's amendments. 162 CONG. REC. H4624-41 (daily ed. July 11, 2016).
- 89 Essex, *supra* note 11, at 14.
- 90 See, e.g., Zimmitti, *supra* note 82 (“[w]hile there are scant, if any, reported opinions on the federal preemption of state laws concerning unmanned aircraft, it is simply a question of when, not if, such cases will appear.”); Gregory M. Palmer & Katherine Abigail Roberts, *Preemptive Effect of Federal Aviation Regulations on State and Local Laws*, FOR THE DEFENSE (Dec. 2016), <http://m.rumberger.com/90F6E0/assets/files/lawarticles/DRI%20Article.pdf>.
- 91 See *supra* notes 80-82.
- 92 LA. REV. STAT. ANN. § 3:41-47.
- 93 N.C. GEN. STAT. § 63-96.
- 94 LA. REV. STAT. ANN. § 3:41-47. “Agricultural commercial operation” means any agricultural facility or agricultural land used for agricultural production or agricultural processing. *Id.*
- 95 S. Con. Res. 124, 2014 Reg. Sess. (La. 2014). The resolution states that 80% of the commercial market for UAS will be for agricultural uses, forecasts the economic impact of UAS, recognizes the benefits of UAS for agriculture, and notes that further study of concerns about UAS in agriculture is essential to continued development and success of Louisiana's UAS agricultural economy.
- 96 LA. REV. STAT. ANN. § 3:44.
- 97 The stakeholder Unmanned Aerial Vehicle Study Group formed by the Louisiana legislature clearly disagreed with the FAA's handling of agricultural UAS prior to the Small UAS Rule. The group provided comments in 2014 to the FAA's Special Rule for Model Aircraft that focused on commercial agricultural operations and asserted that such operations should be allowed to use UAS within their properties, that agricultural uses of UAS required new and completely separate sections of policy, and that states should be allowed to develop regulatory policies for UAS beyond FAA's guidelines. Letter from Francis C. Thompson, Chairman, Louisiana Unmanned Aerial Vehicle Study Group, to U.S. Dep't of Transp. Docket Operations (Sept. 23, 2014), http://www.agandruralleaders.org/sites/default/files/resource/2015/12_LA_FAA_resolution.pdf.
- 98 LA. REV. STAT. ANN. § 3:43.
- 99 LA. REV. STAT. ANN. § 3:46.
- 100 Unmanned Aerial Systems, 42 La. Reg. 297 (proposed Feb. 20, 2016). The proposed regulations share several similarities with the FAA Rule and require registration of UAS, licensure of operators following completion of an educational and safety training course, and operating rules.

- 101 N.C. GEN. STAT. § 63-96.
- 102 *Id.*
- 103 See *Commercial Operators*, N.C. DEPT TRANSP., <https://www.ncdot.gov/aviation/uas/operators/> (last visited Dec. 28, 2017).
- 104 See *Commercial Terms & Conditions*, N.C. DEPT TRANSP., https://www.ncdot.gov/aviation/uas/terms/#comm_terms (last visited Oct. 25, 2017).
- 105 A growing body of scholarship analyzes privacy rights as applied to UAS operations by governmental users and private citizens, which we don't attempt to address fully in this article. See, e.g., Joseph J. Vacek, *Big Brother Will Soon Be Watching-- Or Will He? Constitutional, Regulatory, and Operational Issues Surrounding the Use of Unmanned Aerial Vehicles in Law Enforcement*, 85 N. D. L. REV. 673 (2009); M. Ryan Calo, *The Drone as Privacy Catalyst*, 64 Stan. L. Rev. Online 29 (2011), <https://www.stanfordlawreview.org/online/the-drone-as-privacy-catalyst/>; Chris Schlag, *The New Privacy Battle: How the Expanding Use of Drones Continues to Erode Our Concept of Privacy and Privacy Rights*, 13 PITT. J. TECH. L. & POL'Y 1 (2013), <http://tlp.law.pitt.edu/ojs/index.php/tlp/article/view/123/126>; David C. Ison et al., *Privacy, Restriction, and Regulation Involving Federal, State and Local Legislation: More Hurdles for Unmanned Aerial Systems (UAS) Integration?* 24 J. AVIATION/AEROSPACE EDUC. & RES. 40 (2014).
- 106 A poll conducted by GfK Roper Public Affairs & Corporate Communications in 2012 indicated that 35% of the 1,006 adults polled were “extremely” or “very” concerned that police department use of UAS would cause them to lose privacy, and 24% were “some-what” concerned. Joan Lowy, *AP-NCC Poll: A Third of the Public Fears Police Use of Drones Will Erode Their Privacy*, AP-GFK (Sept. 27, 2012), <http://ap-gfkipoll.com/uncategorized/our-latest-poll-findings-13>. But see Gregory McNeal, *Drones and Aerial Surveillance: Considerations for Legislators*, BROOKINGS INST. (Nov. 2014), <https://www.brookings.edu/research/drones-and-aerial-surveillance-considerations-for-legislatures/> (arguing that it is premature to conclude that widespread privacy violations by unmanned aircraft are imminent).
- 107 *Operation and Certification of Small Unmanned Aircraft Systems*, 81 Fed. Reg. 42064, 42191-92 (June 28, 2016) (codified at 14 C.F.R. § 107). There is considerable debate over whether the FAA can or should regulate UAS privacy issues. Some criticize the FAA for its position on privacy, asserting that the agency has “skirted, avoided, and delayed involvement in the privacy quandary by placing the burden on operators.” Ison et al., *supra* note 105, at 41. Conversely, others claim that the FAA is not equipped to regulate UAS privacy invasions. Schlag, *supra* note 105, at 2.
- 108 *Promoting Economic Competitiveness While Safeguarding Privacy, Civil Rights, and Civil Liberties in Domestic Use of Unmanned Aircraft Systems*, 80 Fed. Reg. 9355 (Feb. 15, 2015). President Obama stated, “[a]lthough these [UAS] opportunities will enhance American economic competitiveness, our Nation must be mindful of the potential implications for privacy, civil rights, and civil liberties. The Federal Government is committed to promoting the responsible use of this technology in a way that does not diminish rights and freedoms.” *Id.* at 9357.
- 109 *Id.*
- 110 NAT'L TELECOMM. & INFO. ADMIN., VOLUNTARY BEST PRACTICES FOR UAS PRIVACY, TRANSPARENCY, AND ACCOUNTABILITY: CONSENSUS, STAKEHOLDER-DRAFTED BEST PRACTICES CREATED IN THE NTIA-CONVENED MULTISTAKEHOLDER PROCESS (2016), https://www.ntia.doc.gov/files/ntia/publications/uas_privacy_best_practices_6-21-16.pdf.
- 111 *Id.* at 3.
- 112 Senator Paul's “Preserving Freedom from Unwanted Surveillance Act of 2012” was not enacted. S. 3287, 112th Cong. (2012). Sen. Paul later used the dangers of governmental UAS activity as the topic of a 12-hour filibuster to delay a vote on President Obama's nomination of John Brennan to head the CIA earning him both criticism and praise for bringing “drone policy” into the national spotlight. See Carrie Johnson, *When Rand Paul Ended Filibuster, He Left Drones on National Stage*, NATIONAL PUBLIC RADIO (Mar. 8, 2013), <http://www.npr.org/2013/03/10/173864536/when-rand-paul-ended-filibuster-he-left-drones-on-national-stage>.

- 113 H.R. 6676, 112th Cong. (2012); H.R. 1262, 113th Cong. (2013); S. 635, 114th Cong. (2014); S. 631, 115th Cong. (2017).
- 114 *See supra* note 112. The mandated data collection statements would require a UAS operator to state whether the unmanned aircraft system would collect information or data about individuals or groups of individuals.
- 115 Kaminski, *supra* note 80, at 66 (arguing (with qualifications) that states should take the lead on privacy regulations governing private UAS use). Privacy rights impacted by law enforcement use, however, require a federal or mixed state and federal approach. *Id.* at 65. Others assert that “the best course of action would be to adopt a carefully constructed federal privacy act governing drones.” Robert H. Gruber, *Commercial Drones and Privacy: Can We Trust States with ‘Drone Federalism’?*, 21 RICH. J. L. & TECH. 14, 42 (2015), <http://scholarship.richmond.edu/cgi/viewcontent.cgi?article=1419&context=jolt>.
- 116 *See Florida v. Riley*, 488 U.S. 445 (1989) (naked eye surveillance from a helicopter operating in public airspace at 400-foot altitude does not require a search warrant); *Dow Chem. Co. v. United States*, 476 U.S. 227 (1986) (use of photographic equipment from an aircraft flying at a legal altitude over “open fields” is not an unconstitutional search under the Fourth Amendment); *California v. Ciraolo*, 476 U.S. 207 (1986) (aerial observation over property from airplane at 1,000-foot altitude does not violate the Fourth Amendment); *Katz v. United States*, 389 U.S. 347 (1967) (physical intrusion is not necessary for Fourth Amendment protection, which extends to a person in a place where that person has a “reasonable expectation of privacy”).
- 117 *See, e.g.*, Kaminski, *supra* note 80, at 65 and Essex, *supra* note 11, at 15.
- 118 *See* Essex and NCSL, *supra* note 11.
- 119 *See, e.g.*, Freedom from Unwarranted Surveillance Act, S.B. 92, 115th Reg. Sess. (Fla. 2013) (UAS use by law enforcement); Preserving Freedom from Unwanted Surveillance Act, S.B. 1067, 62d Leg. (Idaho 2013) (UAS use by governmental and private users); Freedom from Drone Surveillance Act, S.B. 1587, 98th Gen. Assemb. (Ill. 2013) (UAS use by law enforcement); S.B. 744, 2013-2014 Sess. (N.C. 2014) (UAS use by private and governmental users); Freedom from Unwarranted Surveillance Act, S.B. 796, 108th Gen. Assemb. (Tenn. 2013) (UAS use by law enforcement); Texas Privacy Act, H.B. 912, 83d Leg. (Tex. 2013) (private UAS use).
- 120 S.B. 1067, 62d Leg., 1st Reg. Sess. (Idaho 2013).
- 121 IDAHO CODE § 21-213.
- 122 IDAHO CODE § 21-213.
- 123 *Id.*
- 124 S.B. 167, 2017 Reg. Sess. (N.M. 2017) (including protection for farms and agricultural operations). The bill's sponsor, Sen. Pino, also introduced the bill in 2013 as S.B. 556 and in 2015 as S.B. 303. Missouri's H.B. 46, 97th Gen. Assemb. (Mo. 2013), also closely resembled Idaho's law.
- 125 H.B. 1099, 2013-2014 Sess. (N.C. 2014).
- 126 *Id.* The committee's substitute, Edition 2 of H.B. 1099, is available at <http://www.ncleg.net/gascritps/BillLookUp/BillLookUp.pl?Session=2013&BillID=H1099>.
- 127 S.B. 766, 2015 Leg., 24th Sess. (Fla. 2015).
- 128 *Katz v. United States*, 389 U.S. 347 (1967) advanced the concept of the “reasonable expectation of privacy test” for purposes of governmental searches pursuant to the Fourth Amendment. The reasonable expectation of privacy test now extends beyond Fourth Amendment challenges and permeates state common law and statutes. *See* Peter Winn, *Katz and the Origins of the “Reasonable Expectation of Privacy” Test*, 40 MCGEORGE L. REV. 1 (2009).
- 129 FLA. STAT. § 934.50.
- 130 FLA. STAT. § 934.50(3)(b).

- 131 FLA. STAT. § 934.50(2)(b).
- 132 FLA. STAT. § 934.50(5).
- 133 MICH. COMP. LAWS § 259.322(3).
- 134 MICH. COMP. LAWS § 259.323. The misdemeanor is punishable by imprisonment for not more than 90 days or a fine of not more than \$500, or both. *Id.*
- 135 S.D. CODIFIED LAWS §22-21-1.
- 136 *Id.* While the prohibition against landing a UAS on another's land or water appears in the invasion of privacy of South Dakota's criminal laws, the provision does not include any reference to surveillance or intent to observe. *Id.*
- 137 UTAH CODE ANN. § 76-9-402(1).
- 138 UTAH CODE ANN. § 76-9-402(2); S.D. CODIFIED LAWS § 22-21-1.
- 139 N.C. GEN. STAT. § 15A-300.1.
- 140 N.C. GEN. STAT. § 15A-300.1(b).
- 141 N.C. GEN. STAT. § 15A-300.1(e).
- 142 TENN. CODE ANN. § 39-13-609. The original version of the law prohibits a law enforcement agency from using a UAS to gather evidence or other information except in specified circumstances such as with a search warrant, and a party harmed by such use may bring a civil action for “all appropriate relief.” *Id.*
- 143 TENN. CODE ANN. § 39-13-904(a).
- 144 TENN. CODE ANN. § 39-13-904(d). Each image capture constitutes a separate offense. *Id.*
- 145 TEX. BUS. & COM. CODE ANN. § 423.003.
- 146 TEX. BUS. & COM. CODE ANN. § 423.006. The definition of “images” is broadly defined to include “any capturing of sound waves, thermal, infrared, ultraviolet, visible light, or other electromagnetic waves, odor, or other conditions existing on or about real property in this state or an individual located on that property.” TEX. BUS. & COM. CODE ANN. § 423.001.
- 147 TEX. BUS. & COM. CODE ANN. § 423.006. The statute lists 21 separate exceptions to the offense in § 423.002.
- 148 TEX. BUS. & COM. CODE ANN. §§ 423.001-004. “Malice” means a specific intent by the defendant to cause substantial injury or harm to the claimant. [Tex. Gov't Code Ann. § 41.001](#).
- 149 LA. STAT. ANN. §14:63(B).
- 150 *Id.* §14:63(b)(3).
- 151 *Id.* §14:63(G). A first offense can result in a \$100-\$500 fine and imprisonment up to 30 days, a second offense ranges from \$300-\$700 in fines and up to 90 days in jail, and repeated offenses thereafter could lead to \$500-\$1,000 in fines and imprisonment up to six months.
- 152 Jason Koebler, *PETA Plans to Fly Drones That Would 'Stalk Hunters'*, U.S. NEWS AND WORLD REP. (Apr. 8, 2013), <https://www.usnews.com/news/articles/2013/04/08/peta-plans-to-fly-drones-that-would-stalk-hunters>.
- 153 Kathleen Gray, *Drones About to be Banned for Hunting, Harassing Hunters*, LANSING ST. J. (Dec. 2, 2014), <http://www.lansingstatejournal.com/story/news/local/2014/12/02/drones-banned-hunting-harassing-hunters/19780325/>.

- 154 See 720 ILL. COMP. STAT. ANN. 5/48-3 (b)(10); MICH. COMP. LAWS ANN. § 324.40112(2)(c); N.H. REV. STAT. ANN. § 207:57(1); N.C. GEN. STAT. ANN. § 113-295(a1); OR. REV. STAT. ANN. § 498.128; TENN. CODE ANN. § 70-4-302(a)(6); WIS. STAT. ANN. § 29.079.
- 155 See Ching Lee, *New CFBF Policy Reflects Changes in Use of Drones*, AGALERT (Dec. 16, 2015), <http://www.agalert.com/story/?id=9099>; Kelly Weill, *Cows Have a New Enemy: Drones*, DAILY BEAST (Feb. 28, 2017), <https://www.thedailybeast.com/cows-have-a-new-enemy-drones>.
- 156 H.B. 217, 62nd Gen. Sess. (Utah 2017). The bill also prohibits livestock harassment using a motor vehicle, all-terrain vehicle, or dog.
- 157 *Id.*
- 158 *Id.*
- 159 S.B. 319, 2015-2016 Gen. Sess. (Kan. 2016).
- 160 KANS. STAT. ANN. § 60-31a01.
- 161 MICH. COMP. LAWS ANN. § 259.322.
- 162 *Id.* “Harassment” means conduct directed toward a victim that includes, but is not limited to, repeated or continuing unconsented contact that would cause a reasonable individual to suffer emotional distress and that actually causes the victim to suffer emotional distress. Harassment does not include constitutionally protected activity or conduct that serves a legitimate purpose. MICH. COMP. LAWS § 750.411(h).
- 163 MICH. COMP. LAWS ANN. § 750.411(h). Punishment for misdemeanor can include not more than one year imprisonment and/or a fine of not more \$1,000. *Id.*
- 164 See Roderick B. Anderson, *Some Aspects of Airspace Trespass*, 27 J. AIR L. & COM. 341 (1961).
- 165 49 U.S.C. § 40103(a)(2) (2012).
- 166 14 C.F.R. § 91.119.
- 167 *Swetland v. Curtiss Airports Corp.*, 55 F.2d 201, 203 (6th Cir. 1932).
- 168 *United States v. Causby*, 328 U.S. 256, 264 (1946). The landmark case involved a farm property in North Carolina located near a military airport. The farmer alleged that aircraft flying as low as 83 feet over his property so frightened his chickens that they flew into the walls and died. The court explicitly rejected the *ad coelum* doctrine, stating that “[c]ommon sense revolts at the idea” of an aircraft operator being subject to countless trespass suits, while recognizing that a landowner must have “exclusive control of the immediate reaches of the enveloping atmosphere.” *Id.* at 264.
- 169 Based upon anecdotal observations from dozens of meetings between the authors and landowners during which consistent comments by landowners suggest a belief that a UAS is trespassing simply if it is visible to a landowner when flying over the owner's property.
- 170 See, e.g., STAFF OF S. JUDICIARY COMM., S. 142, 2015-2016 REG. SESS., Bill Analysis at 4 (Ca. 2015).
- 171 H.R. 2710, 2013 Reg. Sess. (Or. 2013). The law does not allow an action against a UAS that is lawfully in the flight path of an airport or runway and in the process of taking off or landing.
- 172 H.R. 2354A, 2015 Reg. Sess. (Or. 2015).
- 173 OR. REV. STAT. ANN. § 837.380(3).
- 174 NEV. REV. STAT. 493.103(1). Nevada's statute also provides that a property owner or occupier may give notification verbally, in writing, or by marking the property with fluorescent orange paint. See NEV. REV. STAT. 207.200(2). Nevada

also prevents a trespass claim against a business registered in the State and authorized to operate under FAA regulations, as long as the UAS flight does not reasonably interfere with the use of the property. [NEV. REV. STAT. 493.103\(2\)\(d\)](#).

175 [OR. REV. STAT. ANN. § 837.380\(4\)](#); [Nev. Rev. Stat. 493.103\(3\)](#).

176 S. 142, 2015-2016 Reg. Sess. (Ca. 2015).

177 Letter from Governor Edmund G. Brown to Members of the California State Senate (Sept. 9, 2015), https://www.gov.ca.gov/docs/SB_142_Veto_Message.pdf.

178 S.B. 142, 2015-2016 Reg. Sess. (Ca. 2015). California law allows damages for wrongful occupation of real property to include the value of the use of the property for the time of the wrongful occupation, the reasonable cost of repair or restoration of the property, and the costs of recovering possession of the property. [CA. CIV. CODE §3334](#).

179 S. 80, 92nd Sess. (S.D. 2017).

180 *Id.* The statute reads like an ordinary trespass offense and doesn't require either actual or intended eavesdropping. The provision excepts forced landings from trespass but states that the UAS owner will be liable for any damages resulting from a forced landing.

181 S. 111, 62nd Leg. Gen. Sess. (Utah 2017).

182 *Id.* Notice may be given by personal communication, fencing or other enclosure, or posting of signs. [UTAH CODE ANN. § 76-6-206](#).

183 *Id.*

184 [UTAH CODE ANN. §§ 76-3-204 and 76-3-301](#). [UTAH CODE ANN. § 76-3-301](#) (establishing misdemeanor penalties of up to \$1,000 and imprisonment for up to six months).

185 [Unmanned Aircraft Operations in the National Airspace System, 72 Fed. Reg. 6689, 6689-90 \(Feb. 13, 2007\)](#) (stating that UAS flown for business purposes must obtain an FAA airworthiness certificate the same as other types of aircraft).

186 *Id.*

187 *See, e.g.*, Jonathan Knutson, *New UAV Rules Should Help Farmers, Ag Businesses*, AGWEEK (July 25, 2016), <http://www.agweek.com/news/business-and-technology/4080630-new-uav-rules-should-help-farmers-ag-businesses>; Elizabeth A. Tennyson, *Small UAS Rules Take Effect*, AIRCRAFT OWNERS AND PILOTS ASSOCIATION (Aug. 29, 2016), <https://www.aopa.org/news-and-media/all-news/2016/august/29/small-uas-rules-take-effect>; Kristine A. Tidgren, *Ground Control, We Have a Rule*, IOWA ST. U. CTR. FOR AGRIC. L. AND TAX'N (June 30, 2016), <https://www.calt.iastate.edu/article/ground-control-we-have-rule>.

188 A number of applicants have shared their test taking experiences online and raised concerns about the application process and difficult or unexpected knowledge test questions. *See, e.g.*, Matt Gunn, *My Experience Taking the FAA 107 Test* (Aug. 29, 2016, 10:37 PM), <https://www.rcgroups.com/forums/showthread.php?2729603-My-Experience-Taking-the-FAA-107-Test>; Miriam McNabb, *How to Pass the Part 107 Test, Part 1: Interview With a Success Story* (Aug. 30, 2016), <http://dronelife.com/2016/08/30/how-to-pass-the-part-107-test-part-1/>.

189 Knutson, *supra* note 187. In addition to the agricultural aerial applicators discussed by Knutson, the Aviation Insurance Association, Aircraft Owners and Pilots Association, and National Association of Realtors advocated for stricter airman certification for UAS operators.

190 Agricultural aerial application involves the spraying of crop protection products on agricultural and forest lands from an altitude of 400 feet or less.

191 *Id.* Visibility tests conducted by the “Think Before You Launch” campaign in 2015 confirmed the industry's belief that aerial applicators could not spot small UAS in mid-air quickly enough to avoid collision. *See NAAA UAS Safety Concerns and Recommendations*, NAT'L AGRIC. AVIATION ASS'N (Feb. 2016), <http://www.agaviation.org/uasnaaaaction>; Jim Moore,

Drones Prove Difficult for Ag Pilots to See, AOPA (Oct. 8, 2015), <https://www.aopa.org/news-and-media/all-news/2015/october/08/unseen-drones> (referring to preliminary test results that, according to a spokesman, indicated that “in flight visual acquisition of a drone also in flight over agricultural land is much more difficult than originally anticipated.”); Jessica Freeman, *Think Before You Launch Executes Drone Visibility Testing at the CoAAA Operation S.A.F.E. Fly-In*, UAS IN AGRIC. LEARNING NETWORK (Nov. 23, 2015), <http://www.learnuasag.org/2015/11/23/think-before-you-launch-executes-drone-visibility-testing-at-the-coaaa-operation-s-a-f-e-fly-in/>.

192 [Operation and Certification of Small Unmanned Aircraft Systems](#), 81 Fed. Reg. 42064, 42089 (June 28, 2016) (codified at 14 C.F.R. § 107).

193 See Kohler, *supra* note 6; (citing Larry Downes, *What's Wrong with the FAA's New Drone Rules*, HARV. BUS. REV. (Mar. 2, 2015), <https://hbr.org/2015/03/whats-wrong-with-the-faas-new-drone-rules#>).

194 Brooks Lindsay, *Drone Drain: How the FAA Can Avoid Draining (and Instead Spur) the American Drone Industry by Adding Nuisance to Its Draft Small UAS Rules*, 10 WASH. J. L. TECH. & ARTS 343, 346-47 (2015) (suggesting that VLOS would cut off a substantial portion of the predicted \$75 billion contribution UAS will make to the U.S. agriculture industry in the first decade of use).

195 See, e.g., Jacqui Fatka, *Drones Rules Don't Include All Ag Wanted*, FARMFUTURES (June 24, 2016), <http://www.farmfutures.com/blogs-drone-rules-dont-include-ag-wanted-11068>; Manning, *supra* note 5 (“[e]ven though the technology on these small unmanned systems is capable of going way beyond the line of sight, until we get avoidance protection set up on all these devices, it's going to be a little down the road ... The point is that we've started.”).

196 Juan Plaza, *Beyond Visual Line of Sight Operations: The Next Target for FAA Regulation*, COM. UAV NEWS (Jan. 30, 2017), <http://www.expouav.com/news/latest/beyond-visual-line-sight-operations-next-target-faa-regulation/>.

197 [Operation and Certification of Small Unmanned Aircraft Systems](#), 81 Fed. Reg. at 42094-95; 14 C.F.R. § 107.205 (addressing VLOS waivers).

198 A Bill to Amend Title 49, United States Code, to Authorize Appropriations for the Federal Aviation Administration, and for Other Purposes, S. 1405, 115th Congress (2017).

199 See David Morgan, *Farm Groups Fight for Drone Freedom*, HUFFINGTON POST (Mar. 25, 2015), http://www.huffingtonpost.com/2015/03/25/farmers-drone-regulations_n_6941692.html; Janelle Atyeo, *South Dakota Ag Groups Call for Flexibility in Drone Rules*, TRI-STATE NEWS (May 13, 2015), http://www.tristateneighbor.com/news/agri-tech/south-dakota-ag-groups-call-for-flexibility-in-drone-rules/article_7a8faea0-f818-11e4-af50-ff20919c23d1.html.

200 See *supra* note 57.

201 [Operation and Certification of Small Unmanned Aircraft Systems](#), 81 Fed. Reg. at 42104.

202 *Part 107 Waivers Granted*, FED. AVIATION ADMIN., https://www.faa.gov/uas/request_waiver/waivers_granted/ (last visited Mar. 21, 2017). The FAA does not report any of the waiver requests as denied. *Id.*

203 *Id.*

204 *Id.*

205 *Id.*

206 While UAS legislative activity has remained steady in the states since the Small UAS Rule's August 29, 2016 effective date, the proposals do not address state regulatory programs. Several bills, however, propose a prohibition of local regulation of UAS. See NCSL, *supra* note 11.

207 See *supra* note 84.

- 208 See Lauren Russell, *PETA Eyes Drones to Watch Hunters, Farmers*, CNN (Apr. 12, 2013), <http://www.cnn.com/2013/04/11/us/animal-rights-drones/>; Michael D'Estries, *Will Potter's Drone Army Sets Its Sights on Factory Farms*, MNN (Oct. 29, 2014), <http://www.mnn.com/your-home/organic-farming-gardening/blogs/will-potters-drone-army-sets-its-sights-on-factory-farms>.
- 209 See Peggy Lowe, *Deploying Drones to get an Overview of Factory Farms*, SALT (July 19, 2014), <http://www.npr.org/sections/thesalt/2014/07/19/332344201/deploying-drones-to-get-big-picture-of-factory-farms-from-above>.
- 210 See, e.g., *Factory Food from Above: Satellite Images of Industrial Farms*, WIRED (Sept. 16, 2017), <https://www.wired.com/2013/09/mishka-henner-factory-farms/>.
- 211 See, e.g., Dairy Herd News Source, *Gary Conklin Speaks Out*, DAIRY HERD MGMT. (Jan. 17, 2011), <https://www.dairyherd.com/article/gary-conklin-speaks-out> (describing the impact of a video released by Mercy for Animals showing acts of animal abuse by a farm employee). The footage was captured by an undercover videographer who did not report the abuse to the farm owner. The employee pleaded guilty to six counts of cruelty to animals and was ordered to undergo psychological counseling, but no charges were brought against the farm owner. Chris Kick, *Conklin Dairy Farm: NO Additional Charges*, FARM AND DAIRY (July 6, 2010), <http://www.farmanddairy.com/news/conklin-dairy-farm-no-additional-charges/15283.html>.
- 212 “Ag-gag” is a controversial term used by animal welfare advocates. The term can provoke negative reactions from both the agricultural community and those who oppose agricultural production practices. We use the term only for lack of a less controversial term to describe statutes that address exposé strategies against farm operations.
- 213 See Gregory S. McNeal, *Poorly Drafted Drone Laws May Shield Crimes from View*, FORBES (July 8, 2014), <https://www.forbes.com/sites/gregorymcneal/2014/07/08/anti-dron-elegislation-protects-animal-abuses-and-other-crimes/#4f9a0ca05d18>.
- 214 See, e.g., [IDAHO CODE ANN. § 18-7042](#). The law establishes criminal penalties for a person who enters an agricultural production facility that is not open to the public and, without the facility owner's express consent or pursuant to judicial process or statutory authorization, makes audio or video recordings of the conduct of an agricultural production facility's operations. *Id.*
- 215 Alicia Prygoski, *Detailed Discussion of Ag-gag Laws*, ANIMAL LEGAL & HIST. CTR., <https://www.animallaw.info/article/detailed-discussion-ag-gag-laws> (last visited Mar. 30, 2017).
- 216 *Animal Legal Def. Fund v. Otter*, 118 F. Supp. 3d 1195 (D. Idaho 2015). The court found that the Idaho legislature intended to “limit and punish” those who would speak out against agriculture and was motivated in part by an “animus to animal welfare groups.” *Id.* at 1201.
- 217 For a critical review of “ag-gag” litigation, see Dan Flynn, *Letter from the Editor: ‘Ag-gag’ End Game in Hands of Many*, FOOD SAFETY NEWS (Mar. 27, 2017) <http://www.foodsafetynews.com/2017/03/letter-from-the-editor-ag-gag-end-game-in-hands-of-many/#.WOGbIWnysvA>.
- 218 See Cori Capik, *Drones to Be Used to Side-Step “Ag Gag” Laws, Photographing Animal Cruelty*, AGFUNDER NEWS (July 9, 2014), <https://agfundernews.com/drones-used-side-step-ag-gag-laws-photographing-animal-cruelty.html>; Russell, *supra* note 208; D'Estries, *supra* note 208; Lowe, *supra* note 209.
- 219 [IDAHO CODE ANN. § 21-213](#).
- 220 See Amy O'Connor, *Insurers Warned to ‘Think Before You Snap’ as Florida Drone Privacy Law Takes Flight*, INS. J. (July 29, 2015), <http://www.insurancejournal.com/news/southeast/2015/07/29/376560.htm>.
- 221 In *Donovan v. Dewey*, 452 U.S. 227, 237 (1981), the U.S. Supreme Court held that “the expectation of privacy that the owner of commercial property enjoys in such property differs significantly from the sanctity accorded an individual's home” in regards to warrantless inspections of commercial property. The Court later added in *Oliver v. United States*, 466 U.S. 170, 179 (1984) that “open fields do not provide the setting for those intimate activities that the [Fourth] Amendment is intended

to shelter from governmental interference or surveillance” and held that “an individual may not legitimately demand privacy for activities out of doors in fields, except in the area immediately surrounding the home.” *Id.* at 179.

222 [Dow Chem. Co. v. United States](#), 476 U.S. 227, 239 (1986).

223 Under Florida's law, an individual is presumed to have a reasonable expectation of privacy if he or she is not observable by a person at “ground level” from a place where that person has a legal right to be, regardless of whether the individual could be observed from the air with a UAS. [FLA. STAT. ANN. § 934.50\(3\)\(b\)](#).

224 *Dow Chem. Co.*, *supra* note 222, at 234 (stating that “EPA, as a regulatory and enforcement agency, needs no explicit statutory provision to employ methods of observation commonly available to the public at large ...”).

225 *See supra* notes 133-36.

226 Louisiana, South Dakota, and Utah provide exceptions for persons operating UAS in compliance with FAA regulations. *See supra* notes 138 and 150.

227 *See supra* note 113.

228 *Id.*

229 *Id.*

230 *See supra* note 156.

231 *Id.*

232 *See supra* notes 161-62.

233 *See supra* note 155.

234 *See supra* note 175.

235 *See supra* note 61.

236 *See supra* note 179.

237 *See supra* note 168.

238 *See supra* notes 172 and 175.

239 See Tim Moynihan, *Things Will Get Messy If We Don't Start Wrangling Drones Now*, WIRED (Jan. 30, 2016), <https://www.wired.com/2016/01/things-will-get-messy-if-we-dont-start-wrangling-drones-now/>.

240 *See, e.g.*, Robert J. Bunker, *Terrorist and Insurgent Unmanned Aerial Vehicles: Use, Potentials, and Military Implications*, U.S. ARMY WAR C. STRATEGIC STUD. INST. (Aug. 2015), <https://ssi.armywarcollege.edu/pdffiles/PUB1287.pdf>.

241 *See* Dan Shea et al., *Drones and Critical Infrastructure*, NAT'L CONF. ST. LEG. (Sept. 12, 2016), <http://www.ncsl.org/research/energy/drones-and-critical-infrastructure.aspx>.

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Summary

The federal government provides credit assistance to farmers to help assure adequate and reliable lending in rural areas, particularly for farmers who cannot obtain loans elsewhere. Federal farm loan programs also target credit to beginning farmers and socially disadvantaged groups.

The primary federal lender to farmers, though with a small share of the market, is the Farm Service Agency (FSA) in the U.S. Department of Agriculture (USDA). Congress funds FSA loans with annual discretionary appropriations—about \$90 million of budget authority and \$317 million for salaries—to support \$8 billion of new direct loans and guarantees. FSA issues direct loans to farmers who cannot qualify for regular credit and guarantees the repayment of loans made by other lenders. FSA thus is called a lender of last resort. Of about \$374 billion in total farm debt, FSA provides about 2.6% through direct loans and guarantees about another 4%-5% of loans.

Another federally related lender is the Farm Credit System (FCS)—cooperatively owned and funded by the sale of bonds in the financial markets. Congress sets the statutes that govern the FCS banks and lending associations, mandating that they serve agriculture-related borrowers. FCS makes loans to creditworthy farmers and is not a lender of last resort. FCS accounts for 41% of farm debt and is the largest lender for farm real estate.

Commercial banks are the other primary agricultural lender, holding slightly more than FCS with 42% of total farm debt. Commercial banks are the largest lender for farm production loans.

Generally speaking, the farm sector's balance sheet has remained strong in recent years. While delinquency rates on farm loans increased from 2008 into 2010 during the global financial crisis, farmers and agricultural lenders did not face credit problems as severe as those of other economic sectors. Since 2010, loan repayment rates have improved, but recent weakness in farm income has begun to put pressure on some farmers' loan repayment capacity.

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Current Situation

Major Players and Market Shares

The federal government has a long history of assisting farmers with obtaining loans for farming. This intervention has been justified at one time or another by many factors, including the presence of asymmetric information among lenders, asymmetric information between lenders and farmers, lack of competition in some rural lending markets, insufficient lending resources in rural areas compared to more populated areas, and the desire for targeted lending to disadvantaged groups (such as small farms or socially disadvantaged farmers).¹

Several types of lenders make loans to farmers. Some are government entities or have a statutory mandate to serve agriculture. The one most controlled by the federal government is the Farm Service Agency (FSA) in the U.S. Department of Agriculture (USDA). It receives federal appropriations to make direct loans to farmers and to issue guarantees on loans made by commercial lenders to farmers who do not qualify for regular credit. FSA is a lender of last resort but also of first opportunity, because it targets loans or reserves funds for disadvantaged groups.

The lender with the next-largest amount of government intervention is the Farm Credit System (FCS). It is a cooperatively owned and funded—but federally chartered—private lender with a statutory mandate to serve agriculture-related borrowers only. FCS makes loans to creditworthy farmers and is *not* a lender of last resort but is a government-sponsored enterprise (GSE). Third is Farmer Mac, another GSE that is privately held and provides a secondary market for agricultural loans. FSA, FCS, and Farmer Mac are described in more detail later in this report.

Other lenders do not have direct government involvement in their funding or existence. These include commercial banks, life insurance companies, individuals, merchants, and dealers.

Figure 1 shows that the FCS and commercial banks provide most of the farm credit (41% and 42%, respectively) followed by individuals and others (9.2%) and life insurance companies (3.5%; based on 2016 USDA data, the most recent year with such detail).² FSA provides about 2.6% of the debt through direct loans. FSA also guarantees about another 4%-5% of the market through loans that are made by commercial banks and the FCS.

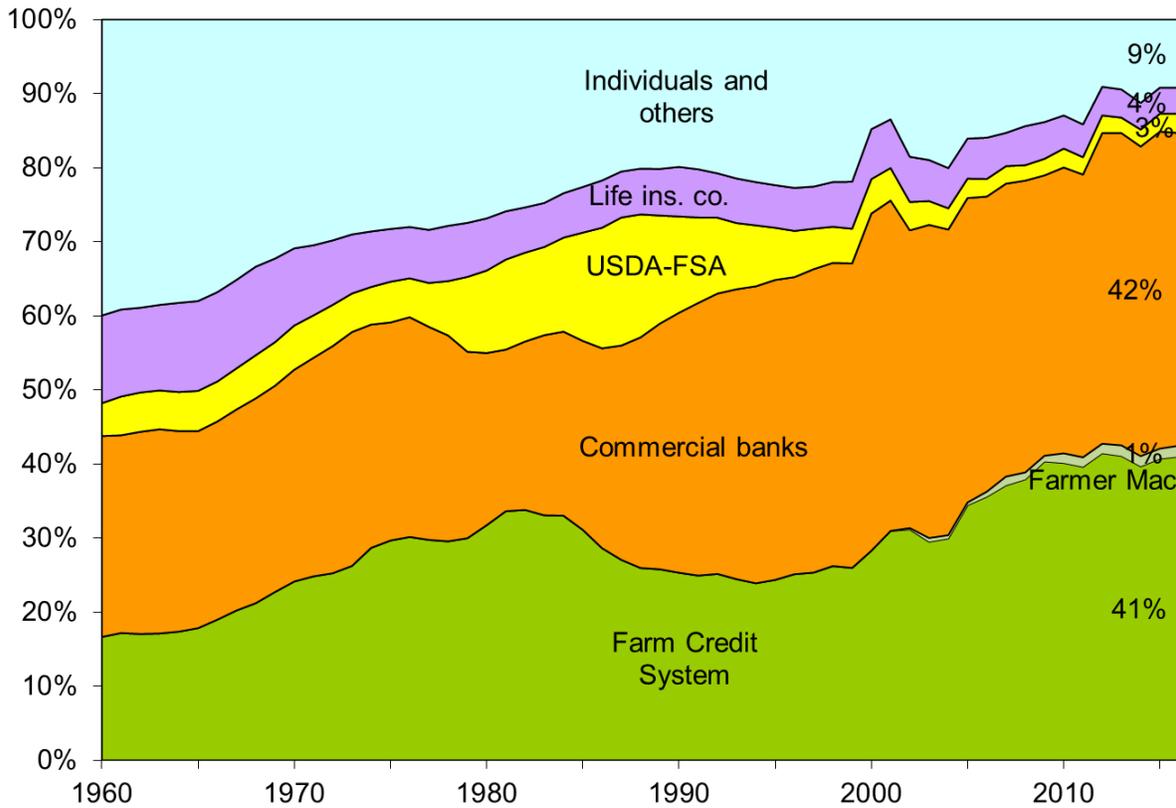
The total amount of farm debt (\$374 billion at the end of 2016) is concentrated relatively more in real estate debt (60%) than in non-real estate debt (40%). FCS is the largest lender for real estate (46%), and both commercial banks' and FCS's shares have grown as others' shares have decreased (**Figure 2**). Commercial banks are the largest lender for non-real estate loans (49%), although FCS has gained share in recent years as the shares by others have decreased (**Figure 3**).

As the figures show, market shares among these lenders have changed over time. Commercial banks held relatively little farm real estate debt through 1985 but now hold a sizeable amount (**Figure 2**). The share of loans from “individuals and others” has steadily decreased over time, with fewer private contracts for farm real estate and relatively less dealer financing in operating credits. FSA held a much larger share of farm debt during the farm financial crisis of the 1980s, but that ratio declined as the farm economy improved through the 1990s (**Figure 3**).

¹ USDA, Farm Service Agency, *Evaluating the Relative Cost Effectiveness of the Farm Service Agency's Farm Loan Programs*, report to Congress, August 2006, pp. 11-17, http://www.fsa.usda.gov/Internet/FSA_File/farm_loan_study_august_06.pdf.

² USDA, Economic Research Service (ERS), <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics.aspx>.

Figure 1. Market Shares by Lender of Total Farm Debt, 1960-2016

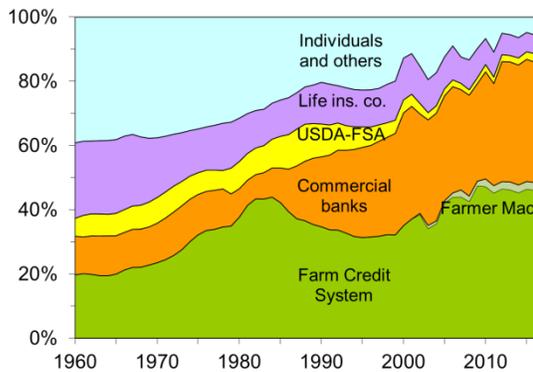


Source: CRS, using USDA Economic Research Service (ERS) year-end data at <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics.aspx>.

Notes: Shares in the graph are for direct loans. Guarantees issued on other lenders' loans are not shown. FSA issued guarantees on about 4%-5% of farm loans that are not shown separately but are included in the shares of commercial banks and the Farm Credit System. ERS began publishing data on Farmer Mac in 2002.

Figure 2. Market Shares of Real Estate Farm Debt, 1960-2016

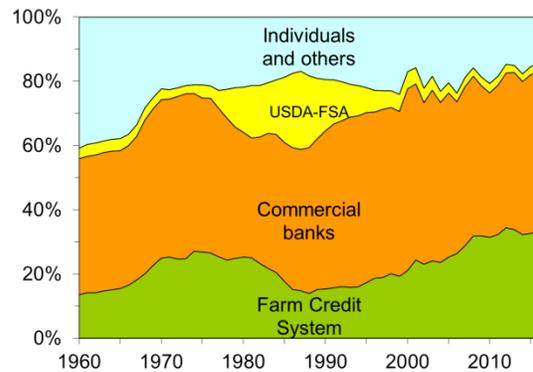
(60% of total farm debt in 2016)



Source: CRS, using ERS data.

Figure 3. Market Shares of Non-Real Estate Farm Debt, 1960-2016

(40% of total farm debt in 2016)



Source: CRS, using ERS data.

The Farm Balance Sheet

As a whole, farm sector assets have remained strong despite pressure on other real estate sectors. The value of farm assets has grown steadily since the end of the 1980s, particularly since 2003. At the end of 2017, farm sector assets totaled \$3.04 trillion. In 2018, USDA forecasts that farm assets will increase 1.6% (**Figure 4**). The Federal Reserve has found declining land values in recent years but a small recovery through 2017.³ Total farm assets now exceed the previous peak from 1980 in inflation-adjusted terms. Real estate is about 83% of the total amount of farm assets; machinery and vehicles are the next-largest category at about 8% of the total.⁴

Farm debt reached a historic high of \$385 billion at the end of 2017 (**Figure 5**). USDA forecasts that debt will increase 1% in 2018. In inflation-adjusted terms, however, this level of debt is still well below the peak debt levels of the 1980s.

Debts and assets can be compared in a single measure by dividing debts by assets—the debt-to-asset ratio. A lower debt-to-asset ratio generally implies less financial risk to the sector than a higher ratio. Farm debt-to-asset ratio levels have declined fairly steadily since the late 1980s after the farm financial crisis and reached a historic low of 11.3% in 2006. When farm asset growth paused in 2009-2010, the debt-to-asset ratio rose slightly to 12.9% (**Figure 6**). After returning to a historic low in 2012, the debt-to-asset ratio rose to 12.7 in 2017 and is forecasted to remain steady in 2018. But as a whole, farms are not as highly leveraged as they were in the 1980s.

Net farm income has become more variable, especially since 2000. After reaching then-historic highs in 2004, net farm income fell by a third in two years (**Figure 7**). After peaking again in 2008, net farm income fell by 25% in 2009. New net farm income highs were set in 2011 and 2013, but USDA's February 2018 forecast of \$60 billion would be a 52% decline from 2013.⁵ The relatively low net farm income forecasted for 2018 is 29% below the 10-year average.⁶

Government payments to farmers have also risen from decades ago but do not always offset the variability in net farm income. Fixed direct payments that were not tied to prices or revenue were the primary form of government payments in recent years. These payments supported farm income but did not necessarily help farmers manage risks. **Figure 8** shows that more of net farm income is coming from the market rather than the government compared to the 1980s.

Another indicator of leverage compares debt to net farm income. A lower debt-to-income ratio (with the ratio expressing the number of years of current income that debt represents) implies less financial risk. The farm-debt-to-net-farm-income ratio is more variable than the debt-to-asset ratio. It reached a 35-year low of 2.3 in 2004 and rose to 4.3 in 2009 before falling again to 2.5 in 2013. However, the decline in net farm income into 2018 has caused it to rise to a ratio of over 6, not seen since the 1980s. This is outside the typical range of 2-4 over the past 50-years and is leading to an observed rise in repayment risk⁷ (**Figure 9**).

³ Federal Reserve Bank of Kansas City, "Farm Economy Seeks Footing," *Main Street Views*, November 2017, <https://www.kansascityfed.org/research/indicatorsdata/agcreditsurvey/articles/2017/11-9-2017/farm-economy-seeks-footing>.

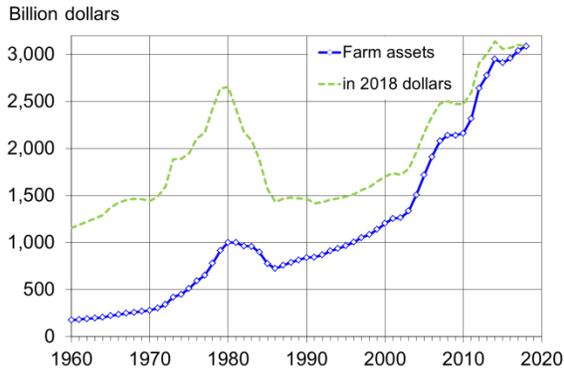
⁴ ERS, *Farm Income and Wealth Statistics*, <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics.aspx>.

⁵ ERS, "Highlights From the February 2018 Farm Income Forecast," February 2018, <https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/highlights-from-the-farm-income-forecast>.

⁶ CRS Report R45117, *U.S. Farm Income Outlook for 2018*.

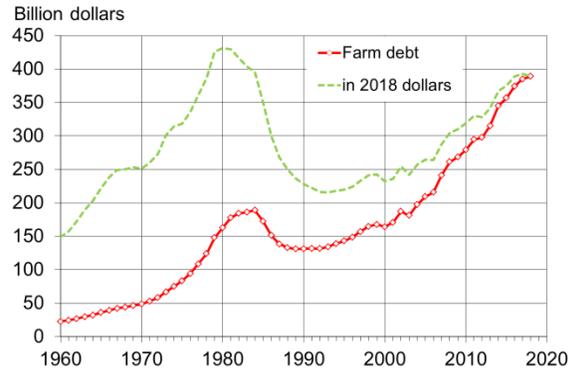
⁷ Federal Reserve Bank of Chicago, *AgConditions*, February 2018, <https://www.chicagofed.org/research/data/ag-conditions/index>.

Figure 4. Farm Assets, 1960-2018



Source: CRS, using ERS data.
Notes: 2018 forecast.

Figure 5. Farm Debt, 1960-2018



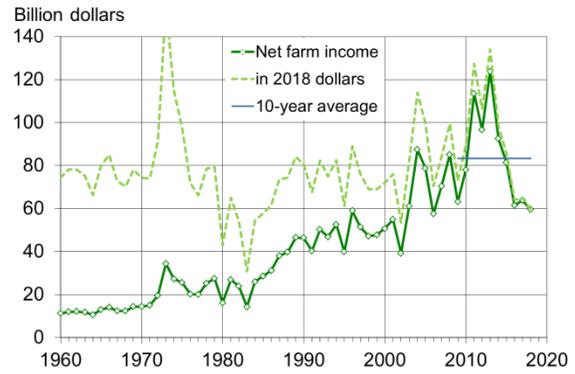
Source: CRS, using ERS data.
Notes: 2018 forecast.

Figure 6. Debt-to-Asset Ratio, 1960-2018



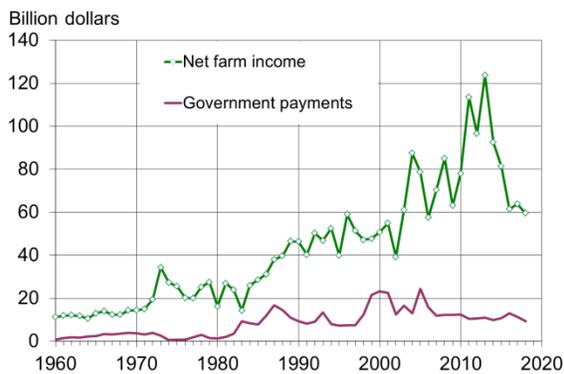
Source: CRS, using ERS data.
Notes: 2018 forecast.

Figure 7. Net Farm Income, 1960-2018



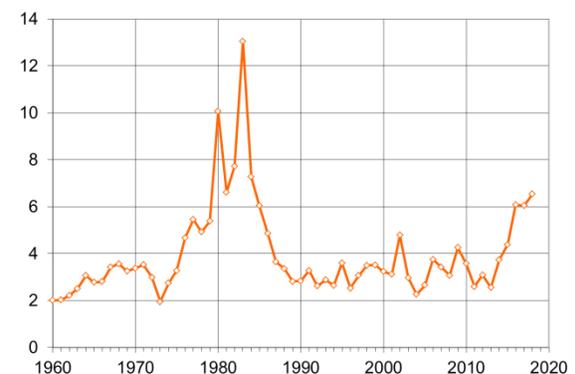
Source: CRS, using ERS data.
Notes: 2018 forecast.

Figure 8. Net Farm Income and Government Payments, 1960-2018



Source: CRS, using ERS data.
Notes: 2018 forecast.

Figure 9. Debt-to-Income Ratio, 1960-2018



Source: CRS, using ERS data.
Notes: 2018 forecast.

Delinquency Rates on Farm Loans

While the global financial crisis in 2008-2009 was slower to affect the balance sheets of farmers and agricultural lenders than the housing market, its presence was observed in agricultural lending. Credit standards were tightened (more documentation and oversight of loans was required), and lenders sometimes made less credit available to producers. As the lender of last resort, the FSA experienced significantly higher demand for its direct loans and guarantees.

In 2007, 2008, and 2010, farm commodity prices were particularly high, supporting farm income at above-average levels. But in 2006 and 2009, net farm income fell by about one-third (**Figure 7**), reducing some farmers' ability to repay loans, particularly in some farm sectors such as dairy, hogs, and poultry. Strong farm income from 2011 to 2013 improved most farmers' ability to repay loans. But weakness in farm income since 2014 has increased pressure on some farmers' repayment capacity.

Delinquency rates include loans that are 30 days or more past due and still accruing interest, as well as those in nonaccrual status. The delinquency rates on residential mortgages and all loans appear to have reached a recent peak in mid-2010 (11.5% for residential mortgages and 7.4% for all commercial bank loans, **Figure 10**). The delinquency rates for agricultural loans did not begin to rise until mid-2008 after continuing to fall to historic lows while delinquencies were rising in residential mortgages and other loans. Moreover, the rate of increase in delinquencies on farm production loans at commercial banks was not as sharp as in the non-farm sectors and peaked in June 2010 at 3.3%. Delinquency rates on farm production loans at commercial banks returned to historic lows below 1% but have risen slightly since 2015 and appear to have stabilized in 2017.⁸

A more severe measure of loan performance is nonperforming loans. Nonperforming loans include nonaccrual loans and accruing loans 90 days or more past due. These loans are more in jeopardy than delinquent loans and represent a smaller subset of loans. Within the agricultural loan portfolio, the FCS nonperforming loan rate has maintained the levels of the mid-2000s that indicated that the system had recovered from the farm financial crisis of the 1980s. FCS nonperforming loans rose from 0.5% at the beginning of 2008 to a near-term peak of 2.8% on September 30, 2009, before decreasing to 0.73% at the end of 2015. While FCS nonperforming loans have risen slightly in 2016 and 2017, they remain below 0.85% into 2018 (**Figure 11**).⁹

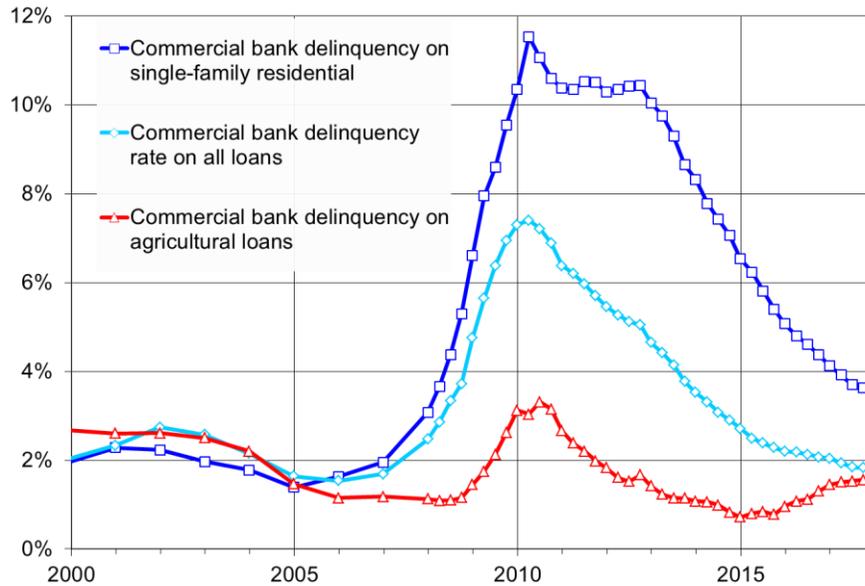
At commercial banks, nonperforming farm loans rose during the 2008-2010 financial crisis, recovered into 2015, but have risen again as declining farm income has stressed repayment. Nonperforming farm real estate loans at commercial banks rose from a low of 0.7% in December 2006 to 2.9% in March 2011 before declining to 1% as of December 31, 2015. Nonperforming farm production loans rose from a low of 0.6% in December 2006 to 2.4% in March 2010 before declining again to 0.4% as of December 31, 2014 (**Figure 11**). Nonperforming loan rates at commercial banks have risen for farm real estate loans and farm production loans to about 1.5% and 1.3%, respectively, at the end of 2017.¹⁰

⁸ Federal Reserve Bank, "Delinquency Rates on Loans at Commercial Banks" (seasonally adjusted), <http://www.federalreserve.gov/releases/chargeoff>.

⁹ FCS, Annual and Quarterly Information Statements, http://www.farmcreditfunding.com/ffcb_live/financialInformation.html?tab=statements.

¹⁰ Federal Reserve Bank, *Agricultural Finance Data Book*, Tables B.2 and B.4, <http://www.kansascityfed.org/research/indicatorsdata/agfinance/index.cfm>.

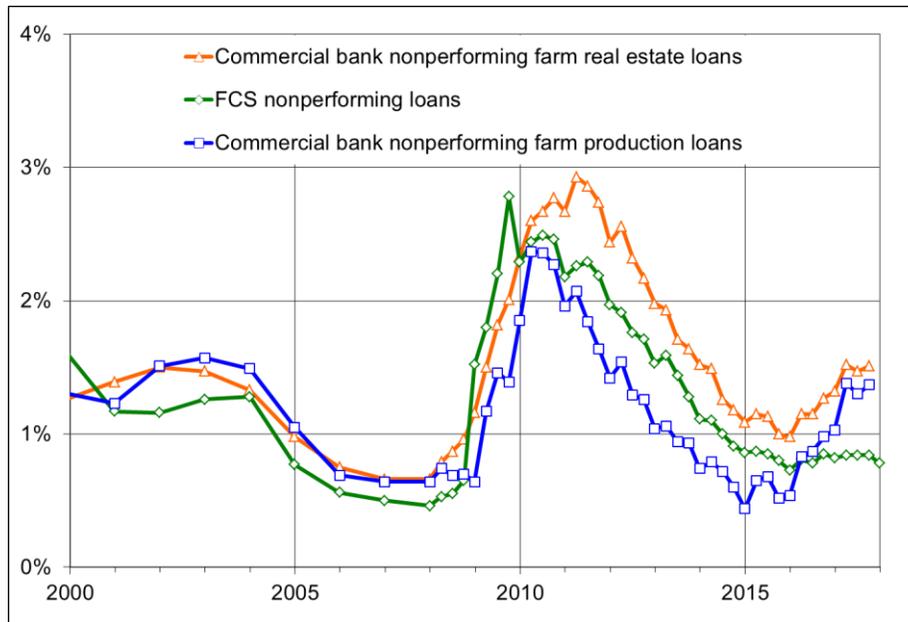
Figure 10. Delinquency Rates on Commercial Bank Loans, 2000-2017Q4



Source: Compiled by CRS. Data through December 31, 2017, using Federal Reserve Bank, “Delinquency Rates on Loans at Commercial Banks” (seasonally adjusted), <http://www.federalreserve.gov/releases/chargeoff>.

Notes: Delinquencies include loans that are 30 days or more past due and still accruing interest, as well as those in nonaccrual status. The amounts are percentages of end-of-period loans.

Figure 11. Nonperforming Farm Loans, 2000-2017Q4



Source: Compiled by CRS. Federal Farm Credit Banks Funding Corporation data through December 31, 2017, <http://www.farmcredit-ffcb.com>. Federal Reserve Bank, *Agricultural Finance Data Book*, Tables B.2 and B.4, through September 30, 2017, <https://www.kansascityfed.org/research/indicatorsdata/agfinancedatabook>.

Notes: Nonperforming loans include nonaccrual loans and accruing loans 90 days or more past due. The amounts are percentages of total loans.

Description of Government-Related Farm Lenders

USDA Farm Service Agency (FSA)

FSA is considered a lender of last resort because it makes direct farm ownership and operating loans to family-sized farms that are unable to obtain credit elsewhere. FSA also guarantees timely payment of principal and interest on qualified loans made by commercial banks and the FCS. Farm bills modify the permanent authority in 7 U.S.C. 1921.

In FY2017, an appropriation of \$90 million in budget authority (plus \$317 million for salaries and expenses) supported \$8 billion of new direct loans and guarantees.¹¹ Direct loans are limited to \$300,000 per borrower (\$50,000 for microloans), and guaranteed loans to \$1,399,000 (adjusted for inflation). Direct emergency loans are available for disasters.¹²

Part of the FSA loan program is reserved for beginning farmers and ranchers (7 U.S.C. 1994 (b)(2)). For direct loans, 75% of the funding for farm ownership loans and 50% of operating loans are reserved for the first 11 months of the fiscal year. For guaranteed loans, 40% is reserved for ownership loans and farm operating loans for the first half of the fiscal year. Funds are also targeted to “socially disadvantaged” farmers by race, gender, and ethnicity (7 U.S.C. 2003). Using these provisions, FSA is also known as lender of first opportunity for many borrowers.¹³

Farm Credit System (FCS)

Congress established the FCS in 1916 to provide a dependable and affordable source of credit to rural areas at a time when commercial lenders avoided farm loans. The FCS is neither a government agency nor guaranteed by the U.S. government but is a network of borrower-owned lending institutions operating as a GSE. It is not a lender of last resort; it is a for-profit lender with a statutory mandate to serve agriculture. Funds are raised through the sale of bonds on Wall Street. Four large banks allocate these funds to 69 credit associations that, in turn, make loans to eligible creditworthy borrowers.

Statutes and oversight by the House and Senate Agriculture Committees determine the scope of FCS activity (Farm Credit Act of 1971, as amended; 12 U.S.C. 2001 *et seq.*). Benefits such as tax exemptions are also provided. Eligibility is limited to farmers, certain farm-related agribusinesses, rural homeowners in towns under 2,500 population, and cooperatives.¹⁴ The federal regulator is the Farm Credit Administration (FCA).¹⁵

Farmer Mac

Farmer Mac is a separate GSE that is a secondary market for agricultural loans. Some consider it related to the FCS in that FCA is its regulator and that it was created by the same legislation, but it is financially and organizationally a separate entity. Farmer Mac purchases mortgages from lenders and guarantees mortgage-backed securities that are bought by investors.

¹¹ CRS Report R44588, *Agriculture and Related Agencies: FY2017 Appropriations*.

¹² FSA, “Farm Loan Program,” <http://www.fsa.usda.gov/dafl>.

¹³ CRS In Focus IF10641, *Farm Bill Primer: Federal Programs Supporting New Farmers*.

¹⁴ CRS Report RS21278, *Farm Credit System*.

¹⁵ CRS In Focus IF10767, *Farm Credit Administration Board Members*.

Recent Congressional Issues for Agricultural Credit

Competition Between Farm Credit System and Commercial Banks

The FCS is unique among the GSEs because it is a retail lender making loans directly to farmers and thus is in direct competition with commercial banks. Because of this direct competition for creditworthy borrowers, the FCS and commercial banks often have an adversarial relationship in the policy realm. Commercial banks assert unfair competition from the FCS for borrowers because of tax advantages that can lower the relative cost of funds for the FCS.¹⁶ They often call for increased congressional oversight. The FCS counters by citing its statutory mandate (and limitations) to serve agricultural borrowers in good times and bad times.¹⁷

In contrast, FSA's loan programs are supported by both the FCS and commercial banks. FSA is not regarded as a competitor since it serves farmers who otherwise may not be able to obtain credit. Commercial banks and the FCS particularly support the FSA loan guarantee program because it allows them to make and service loans that otherwise might not be possible or at reduced risk.

Credit Title in the Farm Bill

Credit issues are not expected to be a major part of a farm bill in 2018 or to be particularly significant in the overall scope of the permanent agricultural credit statutes. Nonetheless, several issues could arise, such as (1) further targeting of FSA lending resources to beginning, socially disadvantaged, and/or veteran farmers and (2) raising the maximum loan size per borrower.

The enacted 2014 farm bill (P.L. 113-79) made relatively small policy changes to USDA's permanently authorized farm loan programs. It gave USDA discretion to recognize alternative legal entities and allowed alternatives to meet a farming experience requirement. It increased the maximum size of down-payment loans and eliminated term limits on guaranteed operating loans, among other changes.¹⁸

Maximum Loan Size per Borrower

For the FSA farm loan program, the maximum loan size per borrower for direct loans is \$300,000 (7 U.S.C. 1925(a)(2) for farm ownership loans, and 7 U.S.C. 1943(a)(1) for farm operating loans). It was last increased in the 2008 farm bill from \$200,000. For FSA guaranteed loans, the maximum size per borrower is presently \$1,399,000, which is a \$700,000 base amount in statute increased annually by an inflation factor (same U.S. Code sections as for direct loans). It was last updated in statute in 1998, when the inflation factor was added.

As the average size of farms has increased and farms have become more capital intensive, these loan limits may increasingly be seen as limiting opportunities for some farmers. Two bills in the 115th Congress would raise these limits:

¹⁶ For example, American Bankers Association, letter to House and Senate Agriculture Committees, February 2, 2015, <http://www.aba.com/Advocacy/LetterstoCongress/Documents/LetterSenateAgCommreFCS-Oversight020215.pdf>.

¹⁷ For example, Farm Credit Council, letter to House and Senate Agriculture Committees, February 5, 2015, http://www.fccouncil.com/files/FCC_Letters_in_Response_to_ABA_5Feb2015.pdf.

¹⁸ For details, see Title V in CRS Report R43076, *The 2014 Farm Bill (P.L. 113-79): Summary and Side-by-Side*.

- S. 1736 would raise the maximum size of direct loans to \$600,000. It would raise the maximum size of guaranteed loans to \$2.5 million, indexed for inflation.
- S. 1921 would similarly raise the maximum size of direct loans to \$600,000. It would raise the maximum size of guaranteed loans to \$3 million, indexed for inflation. The bill would also update and increase the overall program authorization levels and provide mandatory funding. The FSA farm loan program has historically been funded with discretionary appropriations.

Term Limits on USDA Farm Loans

Congress added “term limits” to the USDA farm loan program in 1992 and 1996 to restrict eligibility for government farm loans and encourage farmers to “graduate” to commercial loans. The term limits place a maximum number of years that farmers are eligible for certain types of FSA loans or guarantees. However, until the end of 2010, Congress had suspended enforcement of term limits on guaranteed operating loans to prevent some farmers from being denied credit, and the 2014 farm bill eliminated that term limit (**Table 1**).

Table 1. Term Limits on Farm Service Agency Loans

Maximum number of years that farmers are eligible for loans

| Type of FSA Loan | Direct loans term limits | Guaranteed loans term limits |
|----------------------|--|------------------------------|
| Farm Operating Loans | 6 years, plus possible 2-year extension ^a | No term limit ^b |
| Farm Ownership Loans | 10 years ^c | No term limit ^d |

Source: CRS, based on statute and unpublished USDA data.

Note: Term limits are separate from the maximum maturity or duration of an individual loan, which may be as long as 40 years for a farm ownership loan or as short as one year for a farm operating loan.

- Direct operating loans are limited to a six-year period. In certain cases, borrowers may qualify for a one-time, two-year extension (7 U.S.C. 1941(c)(1)(C) and (c)(4)). In June 2009, USDA said that about 4,800 FSA borrowers were limited to one more year, and another 7,800 borrowers were limited to two more years. USDA did not expect many to graduate to commercial credit (FSA Administrator, testimony to the House Agriculture Subcommittee on Conservation, Credit, Energy and Research, June 11, 2009).
- Prior to the 2014 farm bill, guaranteed operating loans were limited to a 15-year period (former 7 U.S.C. 1949(b)(1)). However, enforcement of that term limit was suspended by statute until December 31, 2010. Upon expiration of the suspension, the 15-year term limit was enforced from 2011 to 2013. In December 2010, USDA had said that about 1,600 borrowers had reached the guaranteed term limit. The 2014 farm bill permanently removed this term limit (P.L. 113-79 §5107).
- A borrower is eligible for direct farm ownership (real estate) loans for a maximum of 10 years after the first loan is made (7 U.S.C. 1922(b)(1)(C)).
- FSA, *Evaluating the Relative Cost Effectiveness of the Farm Service Agency’s Farm Loan Programs*, report to Congress, August 2006, p. 76, http://www.fsa.usda.gov/Internet/FSA_File/farm_loan_study_august_06.pdf.

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GENE EDITING: BIOTECHNOLOGY BREAKTHROUGHS AND CHALLENGES

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CRISPR, an acronym for Clustered Regularly Interspaced Short Palindromic Repeats, is a novel gene editing technology that has been called one of the greatest scientific discoveries in the last century.¹ The CRISPR system, also known as the “CRISPR-Cas9” system, is a simple and inexpensive method to identify an “unhealthy” genetic sequence in an organism, cut the sequence out, and then replace the removed “unhealthy” sequence with a “healthy” version.² This amazing process results in an organism with a corrected genetic sequence. In some cases, the organism with corrected genetic sequence is made up entirely of its own native genes and is indistinguishable from an organism that has undergone natural breeding selection.³

The instances in which the CRISPR system can use an organism’s own genetic library to correct damaged DNA results in a far different outcome than some methods that have been historically used to create GMOs.⁴ Using CRISPR in this capacity, the corrected genetic system is not a “hybrid” mishmash of DNA obtained from different organisms. Instead, the corrected DNA in a CRISPR-modified organism comes from the organism itself.⁵ In other words, although an organism does in fact undergo genetic editing using CRISPR, the resulting CRISPR-modified organism is indistinguishable from a normal organism in nature that is free of the ailment that was fixed by the CRISPR process.⁶

In particular, the agricultural community is struggling to understand how the CRISPR system will affect current procedures, processes, and products. In this regard, Maywa Montenegro, a food systems researcher and a PhD candidate in Environmental Science, Policy and Management at the University of California, Berkeley, may have said it best:

CRISPR is giving us a rare opportunity, then, to escape GMO definitions stuck in the 1980s and begin treating agriculture and food as the complex systems they are. It invites us to update biotech governance to include expertise from a wider public and range of sciences. We’ll need to consult not just geneticists but also ecologists. Not just natural scientists but social scientists. Not just scientists, but farmers, consumers, seed producers and workers across the food chain.⁷

In summary, CRISPR is a game changer for defining what is and what is not a genetically modified organism. This paper will explain the science of using the CRISPR system as a genetic editing

¹ See Antonio Regalado, *Who Owns the Biggest Biotech Discovery of the Century?*, MIT TECH. REV. (Dec. 4, 2014), <https://www.technologyreview.com/s/532796/who-owns-the-biggest-biotech-discovery-of-the-century/>.

² *Id.*

³ *Id.*

⁴ *Id.*

⁵ *Id.*

⁶ <https://www.sciencedaily.com/releases/2015/10/151019123744.htm>

⁷ Maywa Montenegro, *CRISPR is Coming to Agriculture – with Big Implications for Food, Farmers, Consumers and Nature*, ENSIA (Jan. 28, 2016), <https://ensia.com/voices/crispr-is-coming-to-agriculture-with-big-implications-for-food-farmers-consumers-and-nature/>.

tool,⁸ the current and potential applications of CRISPR in animals and plants,⁹ the important battle over the inventorship of the CRISPR process that will ultimately determine the true owner of the technology,¹⁰ and the growing regulatory quandary faced by various countries on how to classify organisms modified by CRISPR.¹¹

THE CRISPR SYSTEM AND ITS USE AS A GENETIC EDITING TOOL

Modifying organisms via genetic manipulation has been the foundation of biotechnology research for several decades.¹² For most organisms, deoxyribonucleic acid (DNA) is the main genetic material and is made of nucleotide bases adenosine (A), thymidine (T), cytidine (C), and guanosine (G).¹³ Nearly all advances in biotechnology research and innovation are developed from this basic framework.

In 1984, CRISPR was first identified during a study of the bacterial genome.¹⁴ CRISPR is represented by short DNA sequences followed by the same DNA sequence in reverse, also known as the “palindromic sequence.”¹⁵ This is followed by about thirty base pairs of DNA, known as “spacer” DNA, which then is followed by a repeat of the palindromic sequence.¹⁶ These DNA sequences represent a significant portion of the bacterial genome and almost all archaea, a domain and kingdom of single-celled microorganisms.¹⁷ For many years, the scientific community assumed that these sequences were nothing more than “junk” DNA due to the frequency of seemingly unimportant repetition in the sequences.¹⁸ This assumption, however, fell by the wayside as more and more genomic information became available to scientists in the 1990s and 2000s.¹⁹

In 2005, researchers discovered that the spacer DNA sequences in the bacterial genome actually matched the DNA sequences known to be present in viruses.²⁰ This breakthrough indicated that the spacer DNA sequences may not be junk DNA after all and ultimately suggested a role in microbial immunity.²¹ Bacteria are commonly infected by viruses, so scientists hypothesized that bacteria may actually integrate the viral DNA into their own DNA as a sort of defense mechanism to quickly identify and disable viruses upon infection.²² In other words, bacteria appeared to be able to take up invading viral DNA and make it part of the bacteria’s own genetic code to form a sort of “catalog” of viral DNA. If a virus infects the bacteria in the future, the bacteria can reference the catalog of viral DNA and readily identify the virus as an invading, non-bacterial organism.

⁸ See *infra* Part II.

⁹ See *infra* Part III.

¹⁰ See *infra* Part IV.

¹¹ See *infra* Part V.

¹² See, e.g., Asude Alpman Durmaz et al., *Evolution of Genetic Techniques: Past, Present, and Beyond*, BIOMED RES. INT’L 1, 1 (2014).

¹³ <https://ghr.nlm.nih.gov/primer/basics/dna>

¹⁴ Michael J. Stern et al., *Repetitive Extragenic Palindromic Sequences: A Major Component of the Bacterial Genome*, 37 CELL 1015, 1015 (1984) (the conserved nucleotide sequence identified as the REP (repetitive extragenic palindromic) sequence in *E. coli* and *S. typhimurium* is now recognized as the first description of the machinery now known as CRISPR technology).

¹⁵ Elizabeth E. Pennisi, *The CRISPR Craze*, 341 SCI. 833, 834 (2013).

¹⁶ Stern et al., *supra* note 18, at 1015.

¹⁷ *Id.*

¹⁸ *Id.* (due to the repetitive nature of REP sequences, it was assumed that DNA only reflected nonsense “junk” sequences in the genome).

¹⁹ See Carl Zimmer, *Breakthrough DNA Editor Born of Bacteria*, QUANTA MAG., Feb. 6, 2015, <https://www.quantamagazine.org/20150206-CRISPR-dna-editor-bacteria>.

²⁰ *Id.*

²¹ *Id.*

²² *Id.*

Dr. Jennifer A. Doudna, a researcher at the University of California, Berkeley, discovered how bacteria utilize CRISPR spacer DNA (crDNA) as a defense mechanism.²³ Bacteria use a single-sided section of crDNA (crRNA) as a guide mechanism, in tandem with an enzyme known as Cas9, to identify a virus that had invaded the bacteria.²⁴ Cas9 is an enzyme that cuts the identified viral DNA at the end of the crRNA complementary sequence, thus inactivating the virus.²⁵ This simple mechanism is very effective at identifying specific genetic sequences and quickly inactivating them to prevent damage. Essentially, the Cas9 enzyme cuts the DNA like scissors, and CRISPR is the guide mechanism that tells Cas9 where to cut.

After realizing the power of CRISPR as a defense system in organisms, scientists began working on how to adapt the process as a genetic editing tool.²⁶ Dr. Doudna and her team modified the system to create a single guide RNA (sgRNA) that could include *any* RNA sequence to direct the Cas9 protein to cut DNA at a specific point.²⁷ The innovative aspect of the CRISPR-Cas9 system is that it uses a RNA-based recognition of DNA instead of a protein-based recognition.²⁸ The result is that the CRISPR-Cas9 system is more effective and simpler than having to produce an individual protein for every desired genetic cleavage, which had been the gold standard in the genetic world.²⁹

Scientists developed several competing genetic-editing technologies before CRISPR, including meganucleases,³⁰ zinc finger nucleases (ZFNs),³¹ and transcription activator-like effector nucleases (TALENs).³² However, CRISPR is seen to be advantageous over the competing systems due to its accessibility, its inexpensive cost, and the ease with which it can be made and used.

To utilize the CRISPR system, scientists first create a CRISPR “guide” molecule that matches a specific DNA sequence of interest.³³ In this regard, CRISPR is used as a kind of GPS device to find its intended target on the DNA double helix where genetic editing is desired.³⁴ Once it arrives at the precise position in the DNA, CRISPR cuts and splices the DNA with Cas9 enzyme in order to remove the sequence from the genome.³⁵ The CRISPR system then incorporates a corrected sequence into the genome provided by scientists to “fix” the cut DNA sequence.

²³ See Dipali G. Sashital et al., *Mechanism of Foreign DNA Selection in a Bacterial Adaptive Immune System*, 46 MOLECULAR CELL 606, 606 (2012).

²⁴ Jennifer A. Doudna & Emmanuelle Charpentier, *The New Frontier of Genome Engineering with CRISPR-Cas9*, 346 SCIENCE 1258096-1, 1258096-2-1258096-3, 1258096-5 fig. 4 (2014).

²⁵ *Id.* at 1258096-2.

²⁶ *Id.* at 1258096-1 to -5.

²⁷ Martin Jinek et al., *A Programmable Dual-RNA-Guided DNA Endonuclease in Adaptive Bacterial Immunity*, 337 SCI. 816, 819–20 (2012).

²⁸ *Id.*

²⁹ Pennisi, *supra* note 19, at 835.

³⁰ Maria Jasin & Rodney Rothstein, *Repair of Strand Breaks by Homologous Recombination*, 5 COLD SPRING HARBOR PERSP. BIOLOGY 1, 5 (2013).

³¹ Matthew H. Porteus & David Baltimore, *Chimeric Nucleases Stimulate Gene Targeting in Human Cells*, 300 SCI. 763, 763 (2003).

³² Matthew J. Moscou & Adam J. Bogdanove, *A Simple Cipher Governs DNA Recognition by TAL Effectors*, 326 SCI. 1501, 1501 (2009).

³³ See Amy Maxmen, *The Genesis Engine*, WIRED, Aug. 2015, <http://www.wired.com/2015/07/crispr-dna-editing-2/>.

³⁴ *Id.*

³⁵ *Id.*

However, in 2018, research demonstrated that changes in DNA can be introduced by CRISPR edits at a farther distance from the target location to be edited than was previously known.³⁶ Further, in a somewhat concerning revelation, standard DNA tests may not normally detect this damage. Previous identification of damage from CRISPR-induced edits was conducted relatively close to the original edit and did not generally find any signs of harm. The research determined that in some cases, the newly identified changes introduced fairly large deletions or insertions, possibly leading to DNA being either switched on or off at inappropriate times as a result of the edits. Although these new findings do not necessarily invalidate the CRISPR approach to gene editing, they certainly represent a good reason for scientists to pay attention to their data in order to address the concerns.

As discussed in Part III of this paper, the CRISPR-Cas9 process has been harnessed into a powerful system that can edit specific sites of DNA in virtually any organism.³⁷ Genetic modifications using CRISPR can be used to activate, add, delete, or suppress genes. In this way, CRISPR acts as a sort of “cut and paste” mechanism for genetic content within targeted regions of an organism's genome. At this early stage of development, the possibilities for CRISPR appear to be nearly endless.

APPLICATIONS OF CRISPR

As with any newly developing technology, the advancement of the CRISPR system is still in its infancy. However, given the simplicity and the low cost of using CRISPR, researchers have already utilized CRISPR to create improved livestock and plants.³⁸ Targeted gene therapies for humans and animals will also likely be forthcoming.³⁹ The estimates of the economic impact of CRISPR are staggering for such a newly developed technology, with one estimate predicting a market of more than \$5.54 billion by 2021.⁴⁰ This section will discuss a few of the recent CRISPR developments for animals and plants.

A. Animal Applications of CRISPR

As CRISPR can be used to genetically edit virtually any germline cell, animals are also at the forefront of the technological applications. CRISPR has the potential to impact not only agriculturally important livestock animals, but also companion animals throughout the world.

Of course, CRISPR modification of animals can also be targeted to impact human health. For instance, researchers are exploring the possibility of altering the pig genome so that pigs could, in theory, grow human organs for transplant.⁴¹ CRISPR can also repair defective DNA in mice and cure them of genetic disorders, which in turn could influence the cure of related human disorders.⁴²

Other animals can benefit from the CRISPR platform, for example by instituting disease resistance into the genome. To combat the depletion of honeybees around the world due to disease and parasites, researcher Brian Gillis is investigating the genomes of “hygienic” honeybees for potential

³⁶ <https://www.extremetech.com/extreme/274110-study-suggests-crispr-gene-editing-could-have-unanticipated-side-effects>

³⁷ See *infra* Part III.

³⁸ See Heidi Ledford, *CRISPR, The Disruptor*, NATURE (June 3, 2015), <http://www.nature.com/news/crispr-the-disruptor-1.17673>.

³⁹ *Id.*

⁴⁰ See *Genome Editing/Genome Engineering Market Worth 5.54 Billion USD by 2021*, MARKETSSANDMARKETS, <http://www.marketsandmarkets.com/PressReleases/genome-editing-engineering.asp> (last visited Aug. 28, 2017).

⁴¹ See Kristen V. Brown, *Inside the Garage Labs of DIY Gene Hackers, Whose Hobby May Terrify You*, FUSION (Mar. 29, 2016, 7:00 AM), <http://projectearth.us/inside-the-garage-labs-of-diy-gene-hackers-whose-hobby-1796423884>.

⁴² See Zimmer, *supra* note 23.

CRISPR application.⁴³ These hygienic bees are known to compulsively clean their hives in order to remove sick and infested bee larvae, and are shown to be less susceptible to mites, fungi, and other pathogens compared to other strains.⁴⁴ Identification of honeybee genomics associated with this hygienic behavior may lead to genomic editing via CRISPR to improve hive health and to stem the worldwide honeybee depletion.

In addition, researchers at the University of Missouri have used CRISPR to modify cell surface proteins in pigs to make them virtually resistant to the deadly swine disease porcine reproductive and respiratory syndrome (PRRS).⁴⁵ According to estimates, PRRS costs producers in North America more than \$600 million on an annual basis,⁴⁶ and there is no cure.⁴⁷ However, using CRISPR, the pig genome was edited to disable the protein responsible for entry of the virus into swine cells, and the modification actually resulted in protection from the deadly disease.⁴⁸

CRISPR could also be used to make agriculture more humane. For example, long horns on cattle can cause injuries, so farmers generally remove the horns via burning, cutting, or chemical techniques.⁴⁹ Although polled cattle varieties exist, crossing these animals with more “elite” meat or dairy cattle breeds may reduce the quality of the resultant offspring.⁵⁰ CRISPR gene editing has been used to eliminate horns from cattle by transferring the non-horn gene from one species into an “elite” breed.⁵¹

Furthermore, CRISPR technology could result in a more fantastical application – reviving species of extinct animals.⁵² Although talk of bringing back the woolly mammoth (*Mammuthus primigenius*) has existed for years, CRISPR may facilitate this undertaking by editing the genome of existing elephant species, such as the Indian elephant.⁵³ Such an application will require several more years of research, but could result in a Jurassic Park-like plotline becoming reality.

In summary, animal applications of CRISPR are far-reaching, but within the purview of researchers around the globe. Generally, given lower regulatory thresholds and fewer social morality issues, applications resulting from CRISPR editing of animal germlines may be more plentiful and faster to market than their human counterparts.

B. Plant Applications of CRISPR

⁴³ Sara Reardon, *Welcome to the CRISPR Zoo*, NATURE (Mar. 9, 2016), <http://www.nature.com/news/welcome-to-the-crispr-zoo-1.19537>.

⁴⁴ *Id.*

⁴⁵ Monique Brouillette, *You Can Edit a Pig, but it Will Still Be a Pig*, SCI. AM., Mar. 2016, at A22, subsequently published as, Monique Brouillette, *Scientists Breed Pigs Resistant to a Devastating Infection Using CRISPR*, SCI. AM. (Mar. 1, 2016), <https://www.scientificamerican.com/article/scientists-breed-pigs-resistant-to-a-devastating-infection-using-crispr/>.

⁴⁶ See Derald J. Holtkamp et al., *Assessment of the Economic Impact of Porcine Reproductive and Respiratory Syndrome Virus on United States Pork Producers*, 21 J. OF SWINE HEALTH AND PROD. (2013).

⁴⁷ See *Porcine Reproductive and Respiratory Syndrome (PRRS)*, THE PIG SITE, <http://www.thepigsite.com/pighealth/article/142/porcine-reproductive-and-respiratory-syndrome-prrs/> (last visited Dec. 14, 2017).

⁴⁸ Brouillette, *supra* note 59.

⁴⁹ Reardon, *supra* note 57.

⁵⁰ *Id.*

⁵¹ Wenfang Tan et al., *Efficient Nonmeiotic Allele Introgression in Livestock Using Custom Endonucleases*, 110 PROC. NAT'L. ACAD. SCI. U.S.16526–27 (2013).

⁵² Reardon, *supra* note 57.

⁵³ *Id.*; See also Zimmer, *supra* note 23.

Applications of CRISPR to the plant world have also flourished.⁵⁴ Published research demonstrates that plant modification via CRISPR is more successful, and also more efficient, than previously developed genetic engineering methods.⁵⁵ Importantly, thanks to CRISPR, curing crop diseases and creating crops that are immune to disease may soon become the normal course for genetically modified plants.⁵⁶

The use of CRISPR for agriculturally important crops is of great significance given the rapidly growing global population. Although the global population has increased by approximately 60% over the past twenty years, grain production per capita has actually decreased worldwide.⁵⁷ If population growth rates continue according to the current pace, the world population will double again within fifty years, and estimates show that food production must also double by the year 2050 in order to keep up with demands.⁵⁸ Therefore, creating new ways to feed a growing population must be explored by any means necessary.

Several success stories of using CRISPR to modify crops have already emerged. For example, Chinese researchers using CRISPR developed a strain of wheat that is resistant to powdery mildew, a destructive fungal pathogen.⁵⁹ The Chinese researchers edited the wheat genome to delete certain genes that encode proteins that repress defenses against the mildew.⁶⁰ Thus, simple genetic editing via CRISPR can stop mildew in its tracks, rather than using heavy doses of fungicides to control the disease.⁶¹ The results are more effective and environmentally friendly compared to current methods.

Researchers have also successfully created tomatoes with prolonged life via CRISPR by turning off the genes that control how quickly the tomatoes ripen.⁶² Furthermore, using CRISPR methods, researchers are working on engineering vegetables that possess enhanced nutrition.⁶³ Because vegetables can make their nutrients more available, such as lycopine and glucosinolates in broccoli, humans can benefit even more from eating their vegetables.⁶⁴

In June 2018, Dr. Michael Gomez, working with partners at the Innovative Genomics Institute, announced that he had succeeded in removing genes from cassava (known in North America as the tapioca product). Cassava is an important crop in Africa and many countries in the southern hemisphere due to its drought resistant properties. Removal of the genes that are responsible for excessive cyanide production in cassava could result in a huge increase in the usefulness of the crop as a food source in these regions.

⁵⁴ Doudna & Charpentier, *supra* note 28, at 1258096-5.

⁵⁵ *Id.*

⁵⁶ See, e.g., Khaoula Belhaj et al., *Plant Genome Editing Made Easy: Targeted Mutagenesis in Model and Crop Plant Using The CRISPR/Cas System*, PLANT METHODS, Oct. 11, 2013, at 1, <https://plantmethods.biomedcentral.com/articles/10.1186/1746-4811-9-39>.

⁵⁷ Samir Suweis et al., *Resilience and Reactivity of Global Food Security*, 112 PROC. NAT'L. ACAD. SCI. U.S. 6902, 6902, 6905 (2015).

⁵⁸ *Id.* at 6902.

⁵⁹ David Talbot, *Chinese Researchers Stop Wheat Disease with Gene Editing*, MIT TECH. REV. (Jul. 21, 2014), <https://www.technologyreview.com/s/529181/chinese-researchers-stop-wheat-disease-with-gene-editing/>.

⁶⁰ *Id.*

⁶¹ *Id.*

⁶² See Michael Specter, *The Gene Hackers*, THE NEW YORKER (Nov. 16, 2015), <http://www.newyorker.com/magazine/2015/11/16/the-gene-hackers>.

⁶³ Jeannine Otto, *More Nutritious and Tastier Vegetables? CRISPR Gene Editing Could Dramatically Boost Consumption*, GENETIC LITERACY PROJECT (Feb. 16, 2017), <https://www.geneticliteracyproject.org/2017/02/16/nutritious-tastier-vegetables-crispr-gene-editing-dramatically-boost-consumption/>.

⁶⁴ Specter, *supra* note 76.

There appears to be a myriad of CRISPR applications in the plant world, and agricultural companies are already on board.⁶⁵ For example, DuPont Pioneer has invested in Caribou Biosciences, the startup co-founded by CRISPR co-inventor Jennifer Doudna, which explores the use of genome editing on corn, soybeans, wheat, and rice.⁶⁶ DuPont Pioneer has announced plans to begin selling seeds made with CRISPR technology within five years.⁶⁷

INVENTORSHIP OF CRISPR

The CRISPR system's multitude of applications, both real and theoretical, is developing at a breakneck pace. But what was the first group to invest in CRISPR's function for gene editing? And, perhaps more importantly, which group owns the intellectual property rights to use CRISPR for gene editing? The final answer is yet to be determined, but is currently playing out in the U.S. Patent Office and perhaps in the federal court system.⁶⁸

The story of who invented the use of CRISPR for gene editing focuses on two research groups.⁶⁹ One research group was led by Dr. Jennifer Doudna at the University of California, Berkeley.⁷⁰ Dr. Doudna and French researcher, Emmanuelle Charpentier, were the first scientists to demonstrate that CRISPR could edit purified DNA, and published these findings in the journal *Science* in the summer of 2012.⁷¹ The second research group was led by the laboratory of Dr. Feng Zhang of The Broad Institute of MIT and Harvard.⁷² In early 2013, Dr. Zhang published research demonstrating that CRISPR could be used to modify human genes.⁷³

The history of the patent applications arising from both Dr. Doudna's group and from Dr. Zhang's group is more complicated.⁷⁴ In March 2013, Dr. Doudna filed a patent application regarding the general CRISPR-Cas9 system, which included a whopping 155 claims.⁷⁵ In October 2013, Dr. Zhang filed a patent application and requested that the application be placed on the accelerated examination track by the United States Patent and Trademark Office (USPTO).⁷⁶

Because of Dr. Zhang's request for his patent to be placed on the accelerated track, Dr. Zhang's patent was first issued on April 15, 2014.⁷⁷ Specifically, the patent granted Dr. Zhang the right to exclude others from implementing the commercial use of CRISPR technology for eukaryotic cells (e.g., cells of humans and other animals).⁷⁸ As a result, Dr. Zhang was granted control over CRISPR applications for use in humans, monkeys, pigs, and mice, which represent the majority of test models that can be used for

⁶⁵ Talbot, *supra* note 73.

⁶⁶ *Id.*

⁶⁷ Specter, *supra* note 76.

⁶⁸ Otto, *supra* note 77.

⁶⁹ Specter, *supra* note 76.

⁷⁰ *Id.*

⁷¹ *Id.*

⁷² *Id.*

⁷³ Le Cong et al., *Multiplex Genome Engineering Using CRISPR/Cas Systems*, 339 *Sci.* 819, 822 (2013); see also Specter, *supra* note 76.

⁷⁴ See generally Jacob S. Sherkow, *The CRISPR Patent Interference Showdown Is On: How Did We Get Here and What Comes Next?*, STAN L. SCH.: L. & BIOSCIENCES BLOG (Dec. 29, 2015), <https://law.stanford.edu/2015/12/29/the-crispr-patent-interference-showdown-is-on-how-did-we-get-here-and-what-comes-next/>.

⁷⁵ U.S. Patent Application No. 13/842,859 (filed Mar. 15, 2013) (priority date May 25, 2012).

⁷⁶ U.S. Patent No. 8,697,359 (filed Oct. 15, 2013) (issued Apr. 15, 2014).

⁷⁷ Sherkow, *supra* note 88.

⁷⁸ *Id.*

advancement of human disease therapeutics.⁷⁹ In other words, with the grant of the patent, Dr. Zhang was given the keys to the vehicle that undoubtedly represents the possibility of generating the most profitable uses of CRISPR technology.

As filed, the two patent applications can seemingly be distinguished.⁸⁰ Dr. Doudna's patent application contained language that could be interpreted to limit the claims to apply CRISPR only to *prokaryotic* cells.⁸¹ In contrast, Dr. Zhang's application claimed a method of performing CRISPR editing in *eukaryotic* cells.⁸² In light of the patent grant to Dr. Zhang, Dr. Doudna's group amended the claims of their patent application to remove the suggestion that the claims are limited to prokaryotic cells.⁸³ This amendment provided Dr. Doudna the opportunity to request that the USPTO determine which competing party is truly entitled to a patent on CRISPR technology.⁸⁴

Clearly, Dr. Doudna's patent application was filed first and thus was given an earlier priority date than Dr. Zhang's patent application. As a result, Dr. Doudna petitioned the USPTO to institute an interference proceeding in order to argue that Dr. Zhang's already issued patent "interfere[ed]" with Dr. Doudna's ability to obtain a patent on her earlier filed application.⁸⁵ The purpose of an interference proceeding is to determine which party was actually the first to invent a particular claimed technology.⁸⁶

On January 11, 2016, the USPTO granted Dr. Doudna's request for an interference proceeding of the two patent filings, and a number of disputed claims between the two patent filings became at issue.⁸⁷ The interference proceeding was thereafter argued before a panel of judges in order to determine who was the true inventor. Several motions and oral proceedings were undertaken before the USPTO issued its decision.

During the interference proceeding, Dr. Zhang's group argued that the two competing patent filings actually represented different claims—Zhang's patent claiming CRISPR for use on eukaryotic cells, and Doudna's patent claiming CRISPR for use on prokaryotic cells like bacteria.⁸⁸ In contrast, Dr. Doudna's group argued that their patent filing dominated the later patent filing by Dr. Zhang because Dr. Doudna's patent application covered all aspects of CRISPR, not just prokaryotes.⁸⁹ In other words, Dr. Doudna asserted that her group was the rightful owner of the patent issued to Dr. Zhang because they, in fact, invented the technology first.

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ '859 Patent Application ("The present disclosure provides genetically modified cells that produce Cas9; and Cas9 transgenic non-human multi-cellular organisms.").

⁸² '359 Patent.

⁸³ Suggestion of Interference Pursuant to 37 C.F.R. § 41.202 at 7, In re Patent Application of Jennifer Doudna et al., U.S. Patent Application Serial No. 13/842,859 (Apr. 13, 2015).

⁸⁴ *Id.* at 1.

⁸⁵ *Id.*

⁸⁶ See Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (codified as amended in scattered sections of 35 U.S.C.); Mark Summerfield, *CRISPR--Will This Be the Last Great US Patent Interference?*, PATENTOLOGY (July 11, 2015, 8:08 PM), <http://blog.patentology.com.au/2015/07/crispr-will-this-be-last-great-us.html>.

⁸⁷ Declaration – 37 C.F.R. § 41.203(b) at 2, Broad Inst. Inc. v. Regents of the Univ. of Cal., No. 106,048 (P.T.A.B. Jan. 11, 2016); Heidi Ledford, *Bitter Fight Over CRISPR Patent Heats Up*, NATURE (Jan. 12, 2016), <http://www.nature.com/news/bitter-fightover-crispr-patent-heats-up-1.17961>.

⁸⁸ Heidi Ledford, *Broad Institute Wins Bitter Battle Over CRISPR Patents*, NATURE (Feb. 15, 2017), <http://www.nature.com/news/broad-institute-wins-bitter-battle-over-crispr-patents-1.21502>.

⁸⁹ *Id.*

In a decision rendered in February 2017, the USPTO upheld the patents issued to Dr. Zhang's group, stating that the patents were valid because they were distinguishable from the patent filings of Dr. Doudna's group.⁹⁰ As a result, the USPTO found that the most lucrative applications of CRISPR technology, the editing of eukaryotic cells such as humans, animals, and plants, belong to Dr. Zhang and The Broad Institute.⁹¹ The decision was immediately reflected in the business world, as stock in Editas Medicine, a biotechnology company that licensed the CRISPR patents owned by The Broad Institute, surged following announcement of the USPTO verdict.⁹²

However, the battle over CRISPR patent rights is far from over. The decision was appealed to the Federal Circuit and remains pending on appeal at the current time. Moreover, the patent rights outside the United States are still up for grabs and a patent battle may be forthcoming in other jurisdictions, such as Europe.⁹³

In the wake of the USPTO's decision, both Dr. Doudna and Dr. Zhang were allowed to maintain ownership of their respective patents.⁹⁴ However, the USPTO interim decision has created a cloud of uncertainty for entities that desire to use CRISPR gene editing in eukaryotic cells. For example, it is unclear if a license for using CRISPR on eukaryotic cells must be obtained from the University of California, Berkeley (the owner of the Doudna patents), The Broad Institute (the owner of the Zhang patents), or both.⁹⁵ If researchers are compelled to obtain a license from both entities, the cost of commercializing CRISPR technology may ultimately increase. However, it does not appear that the ongoing patent rights battle has slowed down research on utilizing CRISPR; in fact, many groups have developed new methods that may be outside the scope of the claims of *both* the Doudna and Zhang patents.⁹⁶

In summary, The Broad Institute won an important early victory in the battle for ownership of CRISPR applications. However, the jury is still out on who will be the ultimate victor in the war. In the meantime, the science surrounding CRISPR continues to march on by exploring even more innovative pathways.

REGULATORY ASPECTS OF CRISPR-EDITED PRODUCTS

As discussed previously, the phrase "genetically modified organism" evokes strong feelings and beliefs from both proponents and opponents of GMOs.⁹⁷ However, the unique mechanism of the CRISPR system presents an opportunity to redefine how "gene edited" animals and plants are viewed by scientists, regulators, and consumers. Before exploring CRISPR's varied regulatory aspects in human, animal, and plant organisms, it is informative to understand the scope of how "traditionally viewed" GMOs are regulated.

A. Current Regulation of GMOs

Generally, there are two processes by which GMOs are regulated by worldwide agencies. The first view is a *product-focused* approach that evaluates the final genetically modified product compared to

⁹⁰ *Id.*

⁹¹ *Id.*

⁹² *Id.*

⁹³ Heidi Ledford, *Why the CRISPR Patent Verdict Isn't the End of the Story*, NATURE (Feb. 17, 2017), <http://www.nature.com/news/why-the-crispr-patent-verdict-isn-t-the-end-of-the-story-1.21510>.

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ *Id.*

⁹⁷ See *infra* Part I.

the natural, unmodified product.⁹⁸ Alternatively, the second view is a *process-focused* approach that emphasizes review of the actual process by which the GMO is produced.⁹⁹ The biotechnology industry prefers regulation that is product-focused because the genetic modification process itself is not stigmatized during evaluation of a GMO. However, in the end, both product *and* process focused regulatory reviews consider the method that is used to produce the GMO, although method of production is considered less in the product-focused review.¹⁰⁰

In the United States, there is no federal legislation specifically directed to review GMOs.¹⁰¹ Instead, GMOs are regulated by various existing government agencies that are set up to evaluate the health, safety, and environmental impact of the products under the Coordinated Framework for Regulation of Biotechnology, published in 1986.¹⁰² According to this regulation, there are three tenets: “(1) U.S. policy would focus on the product of genetic modification (GM) techniques, not the process itself, (2) only regulation grounded in verifiable scientific risks would be tolerated, and (3) GM products are on a continuum with existing products and, therefore, existing statutes are sufficient to review the products.”¹⁰³

The process of regulatory review and approval varies depending on the type of GMO.¹⁰⁴ For example, “food, drug, and biological product GMOs are regulated under the Federal Food, Drug, and Cosmetic Act and the Public Health Service Act . . . by the Food and Drug Administration (FDA).”¹⁰⁵ Plant GMOs are regulated according to the “Animal and Plant Health Inspection Service by the U.S. Department of Agriculture (USDA) under the Plant Protection Act.”¹⁰⁶ Pesticide and microorganism GMOs are regulated pursuant to the “Federal Insecticide, Fungicide and Rodenticide Act and the Toxic Substances Control Act by the Environmental Protection Agency (EPA).”¹⁰⁷

Compared to other countries, regulation on GMO development in the United States is relatively favorable. For the U.S., GMOs are very important to the biotechnology industry from an economic standpoint. For example, the U.S. leads the world in producing genetically modified crops. In 2012, there were 420.8 acres of biotech crops worldwide, and the U.S. accounted for over 40% of this production (171.7 acres).¹⁰⁸ Furthermore, the majority of several different types of crops grown in the U.S. are now comprised of genetically engineered varieties.¹⁰⁹ For instance, in 2013, 93% of the soybeans, 90% of the cotton, and 90% of the corn grown in the U.S. were genetically engineered crops, due to either herbicide tolerance or an insect resistance.¹¹⁰

⁹⁸ S.J. Mayer, *The Regulation of Genetically Modified Food*, in 13 BIOTECHNOLOGY 91 (Horst Werner Doelle et al., eds., 2009).

⁹⁹ *Id.*

¹⁰⁰ *Id.*

¹⁰¹ *Restrictions on Genetically Modified Organisms: United States*, LIBR. OF CONGRESS (Jun. 9, 2015), <https://www.loc.gov/law/help/restrictions-on-gmos/usa.php>.

¹⁰² *Id.*

¹⁰³ Emily Marden, *Risk and Regulation: U.S. Regulatory Policy on Genetically Modified Food and Agriculture*, 44 B.C. L. REV. 733, 738 (2003).

¹⁰⁴ LIBR. OF CONGRESS, *supra* note 115.

¹⁰⁵ *Id.*

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

¹⁰⁸ CLIVE JAMES, INT’L SERV. FOR THE ACQUISITION OF AGRI-BIOTECH APPLICATIONS, BRIEF 44: GLOBAL STATUS OF COMMERCIALIZED BIOTECH/GM CROPS 7 (2012). <https://www.loc.gov/law/help/restrictions-on-gmos/usa.php>

¹⁰⁹ See *Recent Trends in GE Adoption*, U.S. DEP’T OF AGRIC., ECON. RES. SERV., <http://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/recent-trends-in-ge-adoption.aspx#.UobvBXL92Dk> (last updated July 12, 2017).

¹¹⁰ *Id.*

On the other side of the spectrum, the regulation of GMOs in the European Union (EU) is vastly different. Regulatory laws passed in 2003 caused the EU to have possibly the most stringent GMO regulations in the world, which primarily utilize the process-based approach to regulatory review.¹¹¹

As of 2010, the EU considers all GMO crops to be “new foods.”¹¹² As a result, each GMO crop is subjected to an extensive, scientific-based evaluation by the European Food Safety Authority (EFSA) on a case-by-case basis.¹¹³ In turn, the EFSA agency reports to the European Commission (EC), which proceeds to draft proposals to either grant or refuse authorization of the GMO crop for submission to the “Section on GM Food and Feed of the Standing Committee on the Food Chain and Animal Health.”¹¹⁴ If accepted, the proposal is then either adopted by the European Commission or is passed on to the Council of Agricultural Ministers.¹¹⁵ Thereafter, the Council has a three-month window to either vote for or against the proposal, and if a majority vote is not achieved, the proposal returns to the EC, which then adopts it.¹¹⁶ The extreme amount of regulatory review and oversight over GMO crops, divided between multiple agencies within the EU, can result in tremendous delays in garnering approval.

The role of the EFSA is to use independent scientific research to advise the EU in order to protect not only consumers but also the environment.¹¹⁷ This risk assessment includes evaluations to the molecular characterization of the GMO crop, its potential toxicity, and also its potential to impact the environment.¹¹⁸ Each GMO that is approved must be reassessed every 10 years.¹¹⁹ Moreover, applicants desiring to cultivate or to process the GMOs must further deliver a detailed surveillance plan outlining the steps to be taken after GMO authorization.¹²⁰ In other words, even after garnering an approval in the EU, the GMO crop is still subject to multiple layers of regulatory review.

B. Regulation of CRISPR Animal Applications

Like human applications of CRISPR, the use of gene editing on animals intended for food would be governed in the United States by the FDA.¹²¹ This process appears to be relatively straightforward, given that the FDA currently regulates genetically engineered animals.

On January 18, 2017, two days before President Obama left office, the FDA released three proposed regulations addressing different categories of products.¹²² In particular, one proposal was directed to regulation of “intentionally altered” DNA in animals.¹²³ According to this draft proposal, the

¹¹¹ John Davison, *GM plants: Science, Politics and EC regulations*, 178 *PLANT SCI.* 94, 94 (2010).

¹¹² *Id.*

¹¹³ *Id.* at 95.

¹¹⁴ *Id.*

¹¹⁵ *Id.*

¹¹⁶ *Id.*

¹¹⁷ EFSA, <http://www.efsa.europa.eu/> (last visited Mar. 4, 2017).

¹¹⁸ *Genetically Modified Organisms*, EFSA, <https://www.efsa.europa.eu/en/topics/topic/genetically-modified-organisms> (last visited Mar. 4, 2017).

¹¹⁹ *Id.*

¹²⁰ *Monitoring Plans and Reports*, EFSA, http://ec.europa.eu/food/plant/gmo/post_authorisation/plans_reports_opinions_en (last visited Mar. 4, 2017).

¹²¹ Amy Maxmen, *Gene-Edited Animals Face US Regulatory Crackdown*, *NATURE* (Jan. 19, 2017), <http://www.nature.com/news/gene-edited-animals-face-us-regulatory-crackdown-1.21331>.

¹²² *Id.*

¹²³ *Guidance for Industry – Regulation of Intentionally Altered Genomic DNA in Animals*, FDA (Jan. 2017), available at

review of *all* animals with an “intentionally altered” genome would be subject to evaluation for safety and efficacy in a manner similar to the review process for new drugs.¹²⁴

This proposed regulation was immediately met with criticism from CRISPR researchers. Given the accuracy and precision of the CRISPR process to edit an animal’s genome without the introduction of nonnative DNA, researchers were hopeful that these gene-editing products would be regulated less stringently than animals that are genetically engineered by introducing foreign DNA.¹²⁵ Furthermore, the inclusion of an “intent” element in the proposed regulation was also questioned.¹²⁶ Because the U.S. has generally followed a product-based approach to regulating genetically-altered animals, many researchers were baffled as to why animals with an “intentionally altered” genome would be subjected to increased scrutiny.¹²⁷ “The trigger for their regulation is whether the animal was intended to be made, and what does intention have to do with risk,” commented Alison van Eenennaam, an animal geneticist at the University of California, Davis. “The risk has to do with the attributes of the product.”¹²⁸

In particular, many people are concerned that, if implemented, the proposed regulations would result in the development of CRISPR-edited animals to slow down or to be abandoned completely by researchers.¹²⁹ In other words, the increased regulation of the animals via FDA review may cause businesses and universities to think twice before investing the time and effort to create improved animals via gene editing. Those who cannot remember the past are condemned to repeat it, and such companies undoubtedly recall the development of genetically engineered salmon by AquaBounty Technologies.¹³⁰

In 1995, AquaBounty began the approval process for the development of an Atlantic salmon (*Salmo salar*) engineered with genes from Chinook salmon (*Oncorhynchus tshawytscha*) in order to promote rapid growth of the genetically modified fish.¹³¹ However, the path to regulatory approval was lengthy and laborious. AquaBounty had to perform over 50 studies to demonstrate that the genetically modified salmon posed no unusual risks before the FDA finally approved the fish for sale in November 2015.¹³² In total, AquaBounty spent approximately \$60 million on the development of the fish. Even after gaining approval, the FDA later determined that the salmon cannot be sold in the United States until a final determination is made on whether the fish must be labeled as genetically modified.¹³³

The FDA’s proposed regulation in January 2017 was a setback to scientists currently engaged in the development of CRISPR-edited animals. For example, the gene editing company Recombinetics, located in St Paul, Minnesota, has developed hornless dairy cattle by using gene editing.¹³⁴ The gene editing to create the polled animal inserts a gene from naturally hornless beef cattle into a breed of the

<https://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/UCM113903.pdf>.

¹²⁴ *Id.*

¹²⁵ Maxmen, *supra* note 143.

¹²⁶ *Id.*

¹²⁷ *Id.*

¹²⁸ *Id.*

¹²⁹ *Id.*

¹³⁰ *Id.*

¹³¹ Amy Maxmen, *Transgenic Fish Wins US Regulatory Backing*, NATURE (Dec. 22, 2012), <http://www.nature.com/news/transgenic-fish-wins-us-regulatory-backing-1.12130>.

¹³² Maxmen, *supra* note 143.

¹³³ *Id.*

¹³⁴ *Id.*

same species used in milk production.¹³⁵ As discussed previously, this process could ease animal welfare concerns associated with the removal of horns via burning, cutting, or chemical techniques.¹³⁶

In December 2016, Recombinetics informed the FDA that it intended to sell food from the genetically edited cattle without receiving FDA approval, which is allowable if the food label states that the product is “generally recognized as safe.”¹³⁷ However, with the uncertainty surrounding the newly proposed FDA regulation, this decision has been thrown into jeopardy.

It is important to note that the January 2017 documents published by the FDA are simply proposals, and full implementation of the proposed procedures will take time, if they happen at all. The draft regulations are subject to receive public comments until April 2017; based on feedback, the regulatory approach may be further modified by the FDA.¹³⁸ Moreover, it is uncertain how the new administration under President Trump will oversee the proposed regulations. In the end, the proposed regulations have been the subject of many discussions for the future of CRISPR’s animal editing, and it remains to be seen whether they represent a speed bump or a roadblock for future developments.

C. Regulation of CRISPR Plant Applications

In the U.S., plants with genetic modifications or genetic editing are regulated by the USDA.¹³⁹ In contrast to human and animal applications of CRISPR, the regulatory pathway for CRISPR-edited plants has already been assessed, both in the United States and abroad.

In April 2016, the USDA determined that a CRISPR-edited mushroom developed by scientists at Penn State University did not have to undergo regulation in the United States prior to being placed on sale.¹⁴⁰ Dr. Yinong Yang, the plant pathologist credited with the creation, used CRISPR to edit the common white button mushroom (*Agaricus bisporus*) so that it would resist browning.¹⁴¹ By editing the mushroom to knock out one gene from the enzyme family that leads to browning, Dr. Yang successfully reduced the enzyme’s activity by 30%.¹⁴² In its evaluation, the USDA determined that since the edited mushroom did not contain any foreign genetic material, and did not represent “a plant pest or weed,” regulation by the agency was unnecessary.¹⁴³

Furthermore, the USDA has also determined that other gene-edited plants (including corn, potatoes, and soybeans that have been edited using TALENs instead of CRISPR) do not require evaluation, according to existing regulations.¹⁴⁴ This decision offers hope to companies and researchers

¹³⁵ *Gene-editing Options*, THE CATTLE BUSINESS WEEKLY (Jan. 25. 2017), <http://cbw60.1upprelaunch.com/Content/Headlines/-Headlines/Article/Gene-editing-options/1/1/8660>.

¹³⁶ See *supra* Part III B.

¹³⁷ Maxmen, *supra* note 143.

¹³⁸ *Id.*

¹³⁹ <http://www.businessinsider.com/the-us-government-says-crop-edited-with-crispr-wont-be-regulated-2016-4>

¹⁴⁰ Emily Waltz, *Gene-edited CRISPR Mushroom Escapes US Regulation*, NATURE (Apr. 14. 2016), <http://www.nature.com/news/gene-edited-crispr-mushroom-escapes-us-regulation-1.19754>.

¹⁴¹ *Id.*

¹⁴² *Id.*

¹⁴³ Julianne Isaacs, *CRISPR-Cas9: A Promising Tool for Plant Breeding*, TOP CROP MANAGER (Oct. 3. 2016), <http://www.topcropmanager.com/plant-breeding/crispr-cas9-a-promising-tool-for-plant-breeding-19611>.

¹⁴⁴ Talbot, *supra* note 73.

pursuing gene-edited crops using CRISPR technology. However, the current regulations are under review and may change in the future.

In March 2018, U.S. Secretary of Agriculture Sonny Perdue issued a statement clarify the USDA's oversight of plants produced via CRISPR.¹⁴⁵ In the statement, Perdue indicated that the USDA has no plans to regulate genome editing when used to produce new plant varieties that are indistinguishable from those bred through traditional breeding methods. This important announcement brought some clarification to parties currently using CRISPR to edit plants.

The review of CRISPR applications to plants is also being conducted abroad. Similar to the United States, countries such as Argentina have indicated that genetically edited plants using CRISPR or TALENs are outside of the scope of existing GMO legislation.¹⁴⁶ In Canada, products are evaluated according to the new "trait" introduced in the plant instead of the process by which the plant was developed.¹⁴⁷ Moreover, the Canadian Food Inspection Agency (CFIA) must assess the environmental safety profile of plants comprising novel traits before the associated product can be released.¹⁴⁸ The jury is still out in China, where authorities have not yet decided whether CRISPR-edited crops will be able to be planted.¹⁴⁹

But the biggest domino yet to fall is if the EU will ultimately decide to regulate CRISPR-edited plants. As discussed previously, the EU has some of the strictest regulations in the world with respect to GMO crops. However, given the differences in CRISPR technology with older methods for genetically modifying plants, the EU may follow the lead of the USDA and determine that CRISPR editing falls outside of the scope of current GMO regulations.

A promising development for proponents of CRISPR in the EU came in late 2015, when the Swedish Board of Agriculture determined that some plants edited using CRISPR technology did not fall under the rigorous EU definition of a GMO.¹⁵⁰ The Board issued its decision following an inquiry from researchers in Umeå and Uppsala in Sweden, and rendered an opinion that although some Arabidopsis plants modified using CRISPR fall within the scope of the EU's GMO definition, other plants do not.¹⁵¹

However, in July 2018, the Court of Justice of the European Union (Europe's highest court) held that that crops created by gene editing would fall under the strict laws restricting the use of GMOs in Europe.¹⁵² The decision represents a tremendous setback for scientists that are interested in the European market. In the decision, the Court stated that the "risks linked to the use of these new mutagenesis techniques might prove to be similar to those that result from the production and release of a GMO through transgenesis (standard genetic modification)."¹⁵³

The court's decision was met with derision by many scientists. Sarah Schmidt, project coordinator at the Institute for Molecular Physiology in the Heinrich Heine University Düsseldorf, called

¹⁴⁵ <https://www.usda.gov/media/press-releases/2018/03/28/secretary-perdue-issues-usda-statement-plant-breeding-innovation>

¹⁴⁶ "Green Light in the Tunnel"! Swedish Board of Agriculture: a CRISPR-Cas9-mutant but Not a GMO, UMEÅ PLANT SCI. CENTRE (Dec. 19, 2016), <https://www.upsc.se/about-upsc/news/4815-green-light-in-the-tunnel-swedish-board-of-agriculture-a-crispr-cas9-mutant-but-not-a-gmo.html>.

¹⁴⁷ Isaacs, *supra* note 164.

¹⁴⁸ *Id.*

¹⁴⁹ Talbot, *supra* note 73.

¹⁵⁰ *CRISPR-Cas9-edited Plant Genomes May Not Be Classified as GMOs*, PHYS. ORG. (Nov. 17, 2015), <https://phys.org/news/2015-11-crispr-cas9-edited-genomes-gmos.html>.

¹⁵¹ *Id.*

¹⁵² <https://www.agri-pulse.com/articles/11274-eu-court-rules-gene-editing-technique-falls-under-gmo-laws>

¹⁵³ *Id.*

the decision “the deathblow for plant biotech in Europe,” that “could slam the door shut on this revolutionary technology.”¹⁵⁴ Likewise, Maurice Moloney, CEO at the Global Institute for Food Security in Canada said that the decision represented “a real step backwards for the EU, for innovation and in the wider context, for global food security,” he said. “It will have the consequence of further disrupting world trade in agricultural products at a critical time for world trading policy.”¹⁵⁵

CONCLUSION

CRISPR technology is moving at a breakneck pace. Although regulatory concerns are certainly valid, the benefits offered by the new technology are also significant for the medical and agricultural world. Thus, it will be imperative for researchers and regulators to find common ground so that these valuable innovations can be brought to market for the benefit of mankind.

¹⁵⁴ <https://sciencebusiness.net/news/ruling-gene-editing-crops-threat-innovation-and-future-food-security-scientists-say>

¹⁵⁵ *Id.*

SYNGENTA CASE SETS BARRIERS & BOUNDARIES FOR GENETICALLY EDITED CROP & ANIMAL PIPELINES

Thomas P. Redick¹

This article addresses the challenges that lie ahead for the latest ground-breaking innovation in agriculture – genetic editing.

I will also outline the current status of and potential impacts from the lawsuits tried and settled against Syngenta for its allegedly negligent disruption the U.S. corn export market to China. While some of those cases against Syngenta are still pending, I will chart the potential barriers that these court decisions and settlements could create for biotech crops down the road. With new tools for plant breeding arriving in the form of genetic editing, the threat of liability could undermine innovation for years to come.

The Syngenta case requires a biotech seed company to seek overseas approvals in a newly broadened, court-defined “major” market for the crop in question. The European Union is a major market for most US crops, and it recently decided to regulate genetic editing as if it were a “GMO” (i.e., a recombinant DNA crop of the first generation of biotech plant breeding).

It is clear that the outcome of this case, which creates a duty of care (under the law of negligence) to seek overseas approval before marketing a new biotech crop, along with the expected steady stream of new laws requiring overseas approval, could create barriers to entry to the future use of all agricultural biotechnology in the United States, including new genetically edited crops and animals.

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I. Agricultural Biotechnology Enters a New Era

Genetic editing has come to agriculture promising new traits created with more speed, lower cost and greater precision than any plant breeding tool to date.

Each past transition in breeding, from hybrids to mutagenesis to recombination and now gene-editing, has had challenges in acceptance. You cannot save the seeds from hybrids and replant them – some growers resented this at first, and there are still corners of the world where hybrid corn is shunned for open-pollinating varieties (often sacrificing higher yields for the “Right to Save Seed”²). Some proponents of traditional and organic agriculture,³ particularly in Europe, continue to promote this outdated, lower productivity approach to plant breeding, sometimes using amusing videos decrying payments of royalties to seed breeders.⁴ Concerns expressed about safety and the environment appear overblown, with the possible exception of the resistant crop treadmill that must be managed to maintain the benefits of many crops, insects and other biotech organisms.

In the final analysis, however, there is no denying that patenting gives a company the right to own and license a living thing. As a result, there is no reason to believe that the organic industry will ever drop its objections to the patents and “industrial” biocides that may be associated with genetic editing in agriculture.⁵ Using this patenting practice as ground to distinguish genetic

² Janak Rhans Ghose, The Right to Save Seed, Rural Poverty and Environment Working Paper Series, Academia.edu (2005) www.academia.edu/2434248/The_Right_to_Save_Seed . (last visited July 20, 2018)

³ Seed Sharing Deemed Illegal in the United States, <https://www.youtube.com/watch?v=txRUeuuKex4> . (last visited July 20, 2018)

⁴ The Right to Save Seed, <https://www.youtube.com/watch?v=33DwBp2QTgg>

⁵ The pipeline of genetically edited crops includes many that will resist commonly used herbicides, for example. See, e.g., Cibus Products, <https://www.cibus.com/products.php> (Cibus is a growth stage company that is currently in the commercialization phase or late-stage development in sulfonylurea (SU) herbicide tolerant **Canola**, glyphosate tolerant Flax, etc.) . (last visited July 20, 2018)

editing in agriculture from past breeding tools that changed DNA (but only used lesser varietal plant patents), it is now clear, after the EU decision discussed below, that nations around the world may raise trade barriers to genetic editing in agriculture, as they become more familiar with genetic editing and the American way of agriculture.

Many more nations are banning biotech crops while endorsing hybrids and mutagenesis breeding, which means that mid-20th Century innovation is finally being accepted in some corners of the world that missed the “Green Revolution”. Such tools account for expanding food production exponentially over the past 100 years, and genetic editing will take its place in further expanding food production as the human population stretches its resource limits in the mid-21st Century.

II. Regulatory Barriers to Entry

Gene editing is new enough to the world that many nations are still working on the issue of whether to require pre-market approval.

a. U.S. Regulation

In the U.S., the 1986 Coordinated Framework for the Regulation of Biotechnology (“Coordinated Framework”) focuses on regulating the process of recombinant DNA (“rDNA”) plant and animal breeding. At the USDA, however, gene editing of crops, however, falls under a “Am I Regulated” website.⁶ USDA has decided not to regulate genetic editing crops unless they carry DNA of a plant pest and since most crops do not carry such DNA sequences, there is no

⁶ United State Department of Agriculture, Biotechnology Regulatory Services, Am I Regulated Under 7 CFR part 340? (Jun 30, 2017) <https://www.aphis.usda.gov/aphis/ourfocus/biotechnology/am-i-regulated>. (last visited July 20, 2018)

regulatory hook for USDA to regulate.⁷ USDA maintains a list of those crops consulted upon, in its

The biotech crop approval process falls under the jurisdiction of USDA's Biotechnology Regulatory Services ("BRS"), which assesses the environmental impacts of biotech crops. If BRS finds no significant impact after a review of the public comments under NEPA and BRS grants the deregulation petition, the way will be cleared for the developer to commercialize the biotech crop.

The EPA has roles in crops that resist herbicides (to approve herbicide uses and warnings) or pests covered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

The FDA, however, issued proposed guidelines to regulate genetically edited animals under its veterinary drug approval process.⁸ This same process was used to approve the Aquabounty® AquAdvantage® Salmon, which encountered many delays before approval (and saw an import ban crop up in the US after approval which prevented sale to Americans).⁹ There

⁷ Isasi, Keiderman & Knoppers, Editing policy to fit the genome? 22 Science 351 at 337-339 (Jan 2016) Vol. Issue 6271, DOI: 10.1126/science.aad6778

⁸ Sarah Zhang, The FDA Wants to Regulate Gene-Editing That Makes Cows Less Horny: What happens when new technology meets old laws, The Atlantic (January 20, 2017) <https://www.theatlantic.com/science/archive/2017/01/the-fda-wants-to-regulate-gene-edited-animals-as-drugs/513686/>; See Also, U.S. Department of Health and Human Services Food and Drug Administration Center for Veterinary Medicine, Draft Guidance for Industry Regulation of Intentionally Altered Genomic DNA in Animal #187, (January 2017) available at <https://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/UCM113903.pdf> (last visited July 25, 2018)

⁹ Brady Dennis, FDA bans imports of genetically engineered salmon — for now, Washington Post (January 29, 2016) online at https://www.washingtonpost.com/news/to-your-health/wp/2016/01/29/fda-bans-imports-of-genetically-engineered-salmon-for-now/?noredirect=on&utm_term=.9f04108d071d (last visited July 31, 2018)

may be some apparent disagreement between USDA and FDA over who should regulate gene-edited animals.¹⁰

b. International Regulation

The European Union's High Court of Justice in July 2018 decided to regulate crops and other organisms produced through genetic editing as if they were a "GMO" under its long-standing "precautionary approach" to regulatory approval. This means that approval times will take several years, sometime longer, for crops to be approved in the EU after being okayed in by North American nations.

The EU's "precautionary approach" is the law followed by the 171 nations that are parties to the Cartagena Protocol on Biosafety ("CPB"). These parties will meet again for the ninth time (COP-MOP 9) in November 2018 in Egypt, and they will address how to develop their unified approach to genetic editing, which falls under a "synthetic biology" descriptor in this international multilateral environmental agreement. Since the US, Canada, Australia, Argentina and other grain exporting nations are not signatories to the CPB, they cannot block consensus on any attempt by these parties to follow the lead of the EU, which is in many instances a key trading partner and source of foreign aid (e.g., in parts of Africa, where the EU's influence on GMO policy is notably strong).

Canada regulate all "novel foods" and includes genetic editing in that category. This encompasses those crops created using non-rDNA methods. For example, both herbicide-resistant crops created using older (chemical-radiation) or newer (genetic editing) forms of mutagenesis would be regulated. It is worth noting that those older forms of plant and animal

¹⁰ Marc Heller, Agencies clash over biotech livestock, E&E News, (April 19, 2018) available at <http://www.sciencemag.org/news/2018/04/us-agencies-clash-over-who-should-regulate-genetically-engineered-livestock> (last visited August 7, 2018)

“mutagenesis” breeding arguably carry greater risks of the “pleiotropic” sort raised by activists, who see risks in off-target effects in genes (the adverse nature of which remain unlinked to health concerns). Since many of these crops have similar ecological effects (e.g., there are mutagenic, r-DNA and genetically edited crops with herbicide resistance, all of which can outcross to wild relatives or cause problematic herbicide-resistant weeds to develop after widespread use), Canada’s regime at least has a consistent approach to similar risks.

Europe has recently decided to apply its “precautionary” regulatory test to these newer forms of mutagenesis plant breeding.¹¹ Sweden, Finland, Belgium and the UK had pre-empted the European Court of Justice ruling by greenlighting field trials of gene-edited plants outside the scope of EU GMO law. “these field trials are now illegal.”¹² and many other nations in Asia and Africa are likely to follow its lead. Notwithstanding the lack of any scientific theory to suggest serious health threat from crops and animals created using this technology, activists have nevertheless asserted that “the behavior of synthetic biological systems is inherently uncertain and unpredictable, yet the precautionary principle is not guiding research and development of synthetic organisms. Risk assessment protocols have not yet been developed to assess the potential ecological risks associated with synthetic biology.”

The international regulatory treaty that allows nations to follow the EU is the Cartagena Protocol on Biosafety (“Biosafety Protocol”), which regulates the release and use of “living modified organisms,” also known as genetically modified organisms (“GMOs”). Gene-edited

¹¹ Jeff Cronin & Ariana Stone, European Union Issues Crucial Ruling on Regulating Gene-Edited Organisms as GMOs (July 26, 2018) <https://cspinet.org/news/european-union-issues-crucial-ruling-regulating-gene-edited-organisms-gmos-20180726> (last visited July 20, 2018)

¹² Press release, New GMOs cannot escape testing and labelling under EU law, EU court rules, Greenpeace (July 25, 2018) <http://www.greenpeace.org/eu-unit/en/News/2018/New-GMOs-cannot-escape-testing-labelling-under-EU-law-EU-court-rules/>

crops would be considered products of “synthetic biology”. The parties to the Biosafety Protocol are calling genetic editing a form of “synthetic biology” and will certainly take up the question of how to regulate genetic editing when they hold their next meeting in 2020, now that the EU (a key party) has decided to regulate genetic editing in agriculture as if it were “GMO” technology. NGOs in opposition to old biotech breeding consider these new plant breeding methods to be “GMOS” like their predecessors, not mere “mutagenesis” (which the organic industry embraces form of chemical or radiation mutagenesis, but shuns more precise genetic editing with its relatively minimal off-target effects to target plant DNA).¹³

As part of the implementation of this law, nations that are parties to the Biosafety Protocol enact legislation, such as the European Traceability Directive, that impose zero-tolerance for the import of any GMO that lacks regulatory approval. More nations are imposing regulatory approval requirements as the Biosafety Protocol is implemented. Any biotech crop that could be exported may also require approval in many of these overseas markets. See Appendix A for a chart compiled from various online regulatory sources, listing approaches being taken in various nations for various types of genetic editing (e.g., Oligo-directed mutagenesis or ODM is the tool used by Cibus San Diego for its genetically edited canola, which is widely marketed in the US and Canada).

For innovators in agricultural biotechnology, these approval requirements for overseas markets can create a barrier to their entry. For example, the new biotech potato that the USDA approved for J.R. Simplot Company, known as the Innate™ potato, may require market approval for export to Japan to avoid causing another costly recall of potato chips in Japan, where regulatory approval and genetically-modified (“GM”) food labeling could complicate the

¹³ Stratfor, How the EU’s Stance on Gene Editing May Evolve, (Jan 29, 2018) <https://worldview.stratfor.com/article/how-eus-stance-gene-editing-may-evolve> (last visited July 23, 2018)

marketing of any foods containing a biotech potato. Simplot's Innate™ potatoes are “cisgenic,” meaning that the genes used to transform are from the same species—wild and commercial potatoes. Simplot applied for approval in China, South Korea, Taiwan, Malaysia, Singapore and Mexico, and plans to apply in the Philippines for its first-generation disease-resistant Innate™ potato.¹⁴

Other genetic editing companies, like Cibus with its genetically edited canola, are getting Canadian and US approval and waiting to see what the Biosafety Protocol will do next, in terms of precautionary regulation.

At the Annual meeting of the Agricultural & Applied Economics Association, the speakers discussed the economic impacts of the EU's decision to regulate, which may spread to up to 100 export markets for soybeans. The entire cost of seeking compliance for a biotech crop was estimated at a range from \$7,060,000 to \$15,440,000¹⁵ and most or all of that cost may now be placed upon genetic editing companies who want to market their crops without undue liability risk.

These overseas regulatory approvals, moratoria and other trade barriers to agricultural biotechnology, including genetic editing in agriculture, have demonstrated their power to cause the common law courts in the United States to wake up, take notice, and impose liability on aspects of marketing crops that are fully approved for sale in the US with no federally-imposed restrictions regarding their potential impact on exports.

¹⁴ John O'Connell, Simplot's Innate GMO bruise-resistant potatoes approved for sale in Japan Capital Press, (September 12, 2017) <https://geneticliteracyproject.org/2017/09/12/simplots-innate-gmo-bruise-resistant-potatoes-approved-sale-japan/> (last visited July 23, 2018).

¹⁵ Nicholas Kalaitzandonakes, Julian M Alston & Kent J Bradford, Compliance costs for regulatory approval of new biotech crops, Nature Biotech (2007) available at <http://www.plantsciences.ucdavis.edu/bradford/Kalaitzandonakes-Compliance%20costs-NBT-2007.pdf> (last visited August 9, 2018).

It is worth noting that the USDA has considered such economic impacts, as the National Environmental Policy Act requires of all federal agencies. It has not, however, managed to have “occupied the field” enough to preempt state tort law awarding growers damages for such economic impacts.

III. Liability Precedents to Syngenta’s Case

This section briefly addresses the mass tort cases that lead up to a finding that export-related trade disruption can be grounds for a negligence trial. In all of these preceding cases, the questions arose from releases of crops that lacked (or had revoked) approval in the U.S.

The scope of liability for biotech crops has been determined in three stages over the past 15 years. After Starlink® corn recognized a claim for nuisance and negligence arising from a physical injury and regulatory violation that led to a U.S. recall, Liberty Link® rice trials awarded damages based on that precedent for disruption of major markets overseas (mainly the EU) from a rice crop lacking US approval at time of commingling. Syngenta’s China case would impose liability for failing to foresee the emergence of a major market and get approval there before allowing Viptera, pending China approval, to commingle in the US corn market.

a. Starlink Corn

The Starlink corn precedent took the first step towards creating biotech seed company liability for failing to foresee the emergence of a major market and get approval there. The court decisions and settlements arising from the sale of Starlink corn by Aventis Crop Sciences USA's predecessor, AgrEvo USA, established that economic injuries could be recovered after commingling of corn that was deemed a “physical injury” to property, including growers’ lost

profits. Since the EPA revoked approval for this crop and declared Starlink corn a potential health risk, it was subject to a nationwide and international recalls, with significant disruption of trade.

Starlink corn set the stage for biotech seed company liability by recognizing claims for nuisance and negligence arising from a company's failure to obtain regulatory approval in overseas markets. Damages paid in settlement were calculated based on the price impacts to commodity corn on the Chicago Board of Trade.

b. Liberty Link Rice

This liability risk was expanded to include economic impact from lack of overseas approval in the LL Rice cases. In December 2011, Bayer AG (the German parent company of Bayer Cropsciences) announced that enough growers had signed its proposed \$750 million settlement with U.S. rice farmers to confirm that it will compensate them for loss of export rice markets. The decision in LL601 Rice established that negligence could apply to crops that the US had eventually approved--but the EU and other major markets had not. This finding of "contamination" from economic impacts was reinforced by language used in a 2010 Supreme Court decision, as is discussed in more detail below at Section II.G.

Bayer failed to prove that farmers should have simply avoided the brief dip in rice prices and suffered no harm. Bayer also lost its argument that prompt U.S. planting approval after years of unauthorized release (commingling across six states in the rice seed supply) would allow Bayer to bar claims for nuisance or negligence using a federal preemption defense. This groundbreaking court decision, LL601 Rice, is the first decision in the U.S. to follow Starlink and allow mass tort plaintiffs to recover their "economic loss" from the "physical injury" that occurs

from commingling a biotech crop (or other crop, like treated seed) where the crop's only flaw -- or material fact, for consumer fraud claims -- is that it was not approved for export to major markets overseas. The settlements Bayer is entering into in LL601 Rice exceed \$1.2 billion, more than the amount reportedly paid in Starlink corn settlements by Bayer's corporate predecessor Aventis. More recent “bellwether” trials raise risks of liability approaching \$1.5 billion in the litigation against Bayer Cropscience USA and its parent, Bayer AG, which deemed to be the legal successor to Aventis (despite the efforts of corporate attorneys to structure the sale of Aventis to Bayer as a sale of assets only, leaving liabilities behind).

Commentators have warned that growers may also be liable for disrupting trade if the law evolves in that direction. This negligence-based liability, however, may not stop only with the large biotechnology firm. Farmers or other operators within the broader agricultural supply chain could face similar claims if they were to be found negligent in any future crop commingling litigation. Therefore, farmers should follow basic precautionary strategies, including reading all the fine print listing various crop planting or marketing restrictions. To date, however, this author has not heard of any biotech crops growers in the US being targeted with claims for disrupting trade.

IV. The Liability Bullseye Expands – US & NCGA Approvals Not Preemptive

As counsel to the American Soybean Association and related entities (United Soybean Board, US Soybean Export Council), I assisted in the creation and maintenance of a “Major Market Approval” policy from 1998 to 2016. This policy was created in close consultation with key grain traders, including Archer Daniels Midland, Bunge North America, Cargill, the International Grain Trade Coalition and others. In confidential gatherings held twice a year

(going by various names, e.g., ASA Biotech Working Group), more recently including the NCGA, the policy on major market approval was applied to establish the markets that seed companies had to get regulatory approval in, before they would market new biotech soybeans or corn to growers.

While this might mean 15-20 markets met the “major” designation for soybean exports, the NCGA only required approval in Japan, while also suggesting that approvals be obtained in other major markets. The grain trade adopted its own policies that went beyond both ASA and NCGA, to require approval in major markets one year before planting.

ASA’s major market approval policy was intended to set a common law duty of reasonable care in protecting exports to major markets for U.S. soybeans. NCGA, in contrast, would not impose a duty for maintaining regulatory approval in any other markets than Japan.

Syngenta hoped to use, as evidence of its due care, the USDA approval of Viptera and NCGA’s request that it be sold without overseas approval in various corn markets. The court denied a procedural motion argument seeking preemption of tort claims due to USDA approval; such preemption of tort claims is getting rarer in US litigation after the Supreme Court rejected FIFRA preemption in *Bates v. Dow*, 8) 544 U.S. 431 (2005), 332 F.3d 323, vacated and remanded (2005) making federal preemption unlikely in the Syngenta cases.

V. Factual Background – Syngenta Pays for its Misleading Messages on China Approval

Syngenta commercialized its biotech corn trait, Agrisure Viptera® MIR162 (“Viptera”) in the United States starting in 2011. Although Syngenta had obtained regulatory approval for the sale of Viptera in the United States, Argentina, Japan, Canada, and the European Union,

Syngenta's application for importation and cultivation approval from the Chinese Ministry of Agriculture was submitted in March 2010.

Nevertheless, Syngenta told growers that it expected approval from China in March 2012, when it should have known, based on feedback from regulatory agencies in China, that approval would still take a year or two more.¹⁶ Like most nations imposing regulatory approval for biotech crops, China had a zero-tolerance policy on the import of biotech corn traits that had not been approved by the Chinese government. Nevertheless, there is no disputing that China had not made any signals of an intent to buy significant shipments of U.S. corn as of spring 2011 when nationwide planting of Viptera began in the United States.¹⁷

In late 2011, citing ““market signals” coming from China about its corn needs and anticipated selling corn to China., several major grain trading companies (Bunge and Consolidated Grain & Barge (CGB)) told growers that they would not buy Viptera corn. They cited potential sales of US corn to China.

Despite the concerns of the grain trade and China's increasing need for imported corn, Syngenta continued to market Viptera in the United States in 2012. Syngenta's decision not to wait for Chinese approval had the support of the NCGA and was consistent with industry precedent. For instance, Monsanto launched several new corn traits (MON89034 in the Genuity VT Triple PRO stack and SmartStax with Dow) without waiting for Chinese approvals in 2010, and these traits were grown on more acres than Syngenta's Viptera traits were grown in 2011.

In late 2011, Syngenta sued Bunge in response to the grain trader's decision to reject Viptera by for allegedly attempting to illegally block the sale of the Agrisure Viptera trait. Since

¹⁶ Paul Christensen, Chinese Approval of Syngenta Agrisure Viptera, Seed in Context Blog (February 21, 2012), <http://www.intlcorn.com/seedsiteblog/?p=268> (last visited April 28, 2017).

¹⁷ Fisher at 5, supra n. 3. (China imports of US corn dipped below one million metric tons (“1 MMT”) from 1.2 MMT in 2009-10 (6th largest) to 980 in 2010-11 (5th largest).

Viptera was sold in compliance with all U.S. regulatory requirements and longstanding industry guidance in the U.S., Syngenta felt it had a legitimate right to sell Viptera corn to willing farmers. After a federal court in Iowa denied Syngenta's request for an injunction and dismissed most of Syngenta's claims, Syngenta dismissed the case in December 2014 following approval of Viptera in China.¹⁸

Over two years later, China stopped accepting all U.S. corn imports in November 2013 and did not begin importing U.S. corn again until late 2014 after China approved Viptera. Although the adverse economic impact of the 13-month trade disruption is debatable given increase in corn yields over the past few years, in April 2014, a grain trade association issued a report suggesting several billions of dollars in adverse economic impacts had been caused by Syngenta's decision to market corn that lacked approval from China.¹⁹

VI. Summary of Litigation Against Syngenta

In late 2014 and early 2015, grain traders sued Syngenta seeking compensation for lost export markets (measured in millions of dollars) and growers filed class actions seeking billions of dollars for alleged impacts to corn prices quickly thereafter. The plaintiffs claimed that Syngenta failed to follow industry standards for stewardship to keep Viptera out of the export

¹⁸ Syngenta's decision to ultimately dismiss the case was likely due to the fact that its event was approved in China, and that it would have been hard to prove that a buyer does not have the right to choose not to spend money on crops or other products based on their international regulatory status. Despite the outcome of the case, one should wonder whether Syngenta's decision to sue Bunge made it easier for grain traders to decide to sue Syngenta over trade disruption.

¹⁹ See Max Fisher, Lack of Chinese Approval for Import of U.S. Agricultural Products Containing Agrisure Viptera™ MIR 162: A Case Study on Economic Impacts in Marketing Year 2013/14, NAT'L GRAIN & FEED ASS'N (April 16, 2014), <http://ngfa.org/wp-content/uploads/Agrisure-Viptera-MIR-162-Case-Study-An-Economic-Impact-Analysis.pdf> (last visited July 20, 2018).

distribution channel and falsely told growers that China would approve the trait in 2012.²⁰ The growers asserted claims based primarily on negligence while the grain traders brought negligence claims and claims under consumer protection statutes. The federal cases ultimately were consolidated in the U.S. District Court for the District of Kansas in Kansas City. Syngenta sought and received a motion to dismiss punitive damages in the Kansas class action before trial.²¹

After dismissing some extraneous claims on summary judgment motions, the MDL court certified the class action. Syngenta's interlocutory appeal of the class certification order was denied.²² A grower²³ wanting to opt out had to send a letter postmarked by April 1, 2017 to be excluded from the class. The first MDL case against Syngenta went to trial in June 2017,²⁴ and the jury returned a unanimous verdict for Plaintiffs (i.e., 7,343 Kansas farmers). The jury awarded full damages in the amount of \$217,700,000 (\$217.7 Million).²⁵ Syngenta filed post-trial motions to dismiss and appeal the verdict after these motions were denied.²⁶ Syngenta had

²⁰ See, e.g., *Hadden Farms Inc. v. Syngenta Corp.*, No. 3:14-cv-03302-SEM-TSH (C.D. Ill. filed Oct. 3, 2014) (class action complaint for damages and injunctive relief), <http://www.fien.com/pdfs/IllinoisvSyngenta.pdf> ("Syngenta Corn Class Action"). (last visited April 28, 2017).

²¹ Todd Neeley, *Viptera Trial Ongoing: Ruling Could Limit Punitive Damages*, (June 19, 2017) available at <https://www.dtnpf.com/agriculture/web/ag/news/article/2017/06/19/ruling-limit-punitive-damages> (last visited August 26, 2017).

²² Tenth Circuit denied Syngenta's Attempt to Appeal the Order on Certification, *Syngenta Corn Litigation*, (December 8, 2016), available at <http://www.syngentacornlitigation.com/2016/12/08/tenth-circuit-denies-syngentas-attempt-appeal-order-granting-class-certification/> (last visited August 26, 2017).

²³ Thomas Capehart, *USDA estimates around 440,000 farmers grow corn in the United States*. (August 16, 2017) available at <https://www.ers.usda.gov/topics/crops/corn/background.aspx> (last visited August 26, 2017).

²⁴ U.S District Judge Certifies Syngenta Corn Case Class Action (Sept. 27, 2016), available at <http://www.syngentacornlitigation.com/2016/09/26/u-s-district-judge-certifies-syngenta-corn-case-class-action/>; Order and notice at www.syngentacornlitigation.com/wp-content/uploads/2016/12/Syngenta2016_Notice_v5.pdf. (last visited April 28, 2017).

²⁵ AP newswire, *The Latest: Syngenta to Appeal \$218M Verdict in Seed Case*, U.S. News & World Report (June 23, 2017) available at <https://www.usnews.com/news/business/articles/2017-06-23/the-latest-syngenta-to-appeal-218m-verdict-in-seed-case>. (last visited August 26, 2017).

²⁶ *Id.*

been acquired by China National Chemical Corp (“ChemChina”) which recently finalized its \$43 billion takeover.

The verdicts and settlements piled up. A jury trial for one Nebraska farmer in April, 2017 settled out for a confidential amount. .²⁷

Syngenta has also won a case; a defense verdict for Syngenta was awarded by a state court in Ohio based on the economic loss doctrine defense. As that court explained its verdict, while it found that Syngenta had a duty to prevent “physical harm” to growers, it ruled that the economic loss sought by this class of growers (who did not allege pollen drift) was barred by the “economic loss doctrine” (“ELD”), because “[t]here has been no case from any court in Ohio...to show that Syngenta’s duty should extend to economic harm caused by the intended use of its products, and this court declines to invent such a duty.”²⁸ In its post-trial motion to dismiss, Syngenta cites this ELD holding and ‘submits that there is a substantial basis for rejecting the conclusion that it was “appropriate for the Court to conclude that a [state] court would apply [the ELD] only . . . when the doctrine’s purposes would be served.”²⁹

Syngenta argued that the very nature of this litigation over the ELD precluded a federal court from reaching decisions on such ELD issues.

The majority rule holds that an integral part of the ELD is the principle that the doctrine should be applied as bright-line rule without case-by-case inquiries into whether the policies behind the doctrine apply on the facts of a particular case. By predicting that the States at issue here would apply the ELD “only . . . when the doctrine’s purposes would be served,” Order 24 n. 10, the Order effectively predicts that all twenty-two States would reject the rule of the Restatement, which does not permit “case-by-case inquiry

²⁷ Margaret Cronin Fisk and Jef Feeley, Syngenta Settles Farmer's Contamination Suit Ahead of Trial, Bloomberg, July 7, 2017, available at <https://www.bloomberg.com/news/articles/2017-07-07/syngenta-settles-farmer-s-corn-contamination-suit-before-trial>. (last visited August 26, 2017).

²⁸ *Fostoria Ethanol, LLC vs. Syngenta Seeds, Inc.*, Ohio Court of Common Pleas, Judgment Awarding Motion to Dismiss, Case No. 15 CV 0323 (June 28, 2017)

²⁹ *In re Syngenta AG MIR162 Corn Litigation*, Syngenta’s Memorandum in Support of Motion to Certify Order on Motions to Dismiss for Interlocutory Appeal Under U.S. Code, §1292(b), Case 2:14-md-02591-JWL-JPO Document 1082 Filed 10/13/15. (last visited August 26, 2017).

into the policies at issue.” Restatement (Third) § 7 cmt. b. At a minimum, such a holding raises substantial grounds for a difference of opinion.”³⁰

Parallel actions by Cargill, a grain trader, are proceeding to trial state court in Louisiana in September 2018.

Non-class cases are also pending – some growers opted out of the class, perhaps remembering resentment of the “gift card” settlements in the StarLink™ (“StarLink”) corn litigation.³¹

Syngenta may choose to wait for various statutes of limitations in key corn belt states to expire to reach a complete settlement of all pending cases. This process could take several years.

III. Can These Syngenta Cases be “Distinguished” and Isolated in Legal Precedential Effect?

Rulings made in this case will define the future boundaries for industry stewardship in all commodity crops, with potential negligence for failing to foresee future disruption of a potentially major export market for corn, soy or other exported agricultural products. For the first time in the history of litigation over biotech crops, a claim for negligence has succeeded against conduct in marketing a crop that had full approval for marketing in the United States disrupted an overseas market causing compensable damages in the form of economic impact. Given the history of similar litigation involving StarLink corn and LibertyLink® (“LL”) rice, the pending Syngenta litigation may expand the boundary of common law negligence. While the NCGA did not consider China to be a “major market” that would have required approval before an unrestricted U.S. launch, this Kansas court found that Syngenta had a duty to seek major

³⁰ *Id.*

³¹ AP Newswire, Modified-Corn Lawsuit Is Settled, N. Y. Times (March 8, 2002) <http://www.nytimes.com/2002/03/08/business/modified-corn-lawsuit-is-settled.html> (last visited August 26, 2017).

market approval (e.g., China, a major market as defined by the grain trade and this court). While courts have traditionally adapted common law claims to address novel challenges and economic harms occurring in society, this case could cause a seismic shift in biotech crop innovation, shutting down some product lines and limiting others to carefully contained production that does not disrupt trade.

As a result, attorneys will be trying to determine where the line of negligence toward export risks will be drawn in future cases. Given the role of underlying factual scenarios in giving rise to precedent, attorney wondering how to advise genetic editing clients of future liability risk should seek to distinguish their clients behavior from Syngenta's behavior, as recorded in the legal opinions arising from this case.

The conduct of Syngenta involved both erroneous predictions about dates of probable approval and the subsequent failure to get approval.³² A future biotech seed company that does not overpromise and underdeliver may have better facts than the Syngenta case, and find safe harbor in a duty that has been approved widely in the industry by growers, grain trades and other major stakeholders.

While Syngenta followed the NCGA's guidance in selling Viptera, it also sued a grain trader that dared to post signs at elevators informing growers it would not purchase corn containing any trace of Viptera (Bunge North America cited "market signals" from Chinese buyers and the lack of Chinese approval for its decision to bar Viptera sales to it.)

³² See, e.g., Syngenta Corn Lawsuit: MIR162 Corn (2018) ("Syngenta misinformed farmers, exporters, and the general public about the potential approval of MIR162 in China. These lawsuits further allege that Syngenta led farmers to believe that approval in China was imminent and that China's failure to approve MIR162 would not impact corn farmers.") <https://stromlaw.com/syngenta-corn-lawsuit/> (last visited July 30, 2018)

By following a more widely recognized duty, the company selling something not approved in some overseas markets cannot be held liable for negligence. This will allow the Syngenta cases to be distinguished on their facts, and thereby limit their legal precedential effect.

Plaintiffs' core claim of negligence³³ has survived all motions and could provide the best route to recovery. To prevail on their negligence claim against Syngenta, the plaintiffs will have to prove that Syngenta had a legal duty to avoid disrupting exports to China and that its failure to exercise due care caused plaintiffs to incur actual damages.

In response, Syngenta will argue that it owed no duty to growers or grain traders to wait for approval from China and that segregation for export interests is the growers' challenge, depending on the buyers' needs. In support of its position, Syngenta will likely cite to the National Corn Growers Association's ("NCGA") policy which did not require such approvals before launching Viptera.³⁴ Syngenta may also seek to rely upon the Biotechnology Industry Association's ("BIO") published standards for stewardship, which discuss the need to seek approval in "major" markets with "functioning" regulatory systems.³⁵ However, it may be an open question whether the 2011 China export corn market was so minimal that it was not "major" and hence the applicable standard of care would only require approval from Japan.

³³ See Non-Producer Plaintiffs' Third Amended Master Complaint at 93-108, *In re Syngenta Corn Litig.*, No. 2:14-md-02591-JWL-JPO (D. Kan. Sept. 19, 2016). Available at <http://www.ksd.uscourts.gov/non-producer-plaintiffs-third-amended-master-complaint-doc-2530/> (last visited April 28, 2017).

³⁴ See, NCGA, *Know Before You Grow*, (2015), <http://www.ncga.com/for-farmers/know-before-you-grow> (last visited May 16, 2015); Biotechnology Industry Organization, EXCELLENCE THROUGH STEWARDSHIP, <http://excellencethroughstewardship.org/> (last visited April 28, 2017).

³⁵ Biotechnology Innovation Organization, *Excellence Through Stewardship* (2015), <http://www.excellencethroughstewardship.org/> (last visited April 28, 2017). (last visited July 30, 2018)

While Syngenta stopped being a member of BIO, it has been a member of BIO's Excellence Through Stewardship (ETS) program since 2008.³⁶ ETS is a program that BIO members sign up for, which requires companies to engage in stewardship for exports, including analyses of market acceptance. Syngenta allegedly failed to implement stewardship to protect exports to China by segregating Viptera to domestic uses.

As Plaintiffs' counsel attests, Syngenta recognized the harm threatened by irresponsible commercialization, quoting it as saying: "There have been a number of high-profile cases involving genetically modified varieties . . . and disruption of international shipments of commodity grains such as corn, wheat, and rice."³⁷

To defeat negligence claims, Syngenta will also argue that the benefits of getting corn traits into production outweighed the alleged adverse economic impacts. Its experts may claim that lower corn prices in the U.S. were due to high U.S. corn production and were not caused by Chinese rejection of U.S. corn.

B. Voluntary Undertaking

As an alternative basis for a duty, plaintiffs alleged that Syngenta owed a duty to them under the voluntary undertaking doctrine. Many states recognize that a duty can arise when a defendant offers to take action to prevent some harm, but negligently fails to fulfill its "voluntary undertaking" (like a "Good Samaritan"). See *McGee v. Chalfant*, 248 Kan. 434 (1991). If Syngenta offered to render stewardship services but failed to exercise due care in the

³⁶ Syngenta Corn Allegation, Factual Allegations, <http://www.syngentacorncase.com/about-the-case/case-updates-documents/class-action/factual-allegations/> (last visited August 9, 2018)

³⁷ Id. Citing <http://www.syngentafoundation.org/index.cfm?pageID=703>.

performance of its stewardship program, it could be liable for the harm caused to the growers and grain traders.

Syngenta has cited its relationship with its seed buyers to reject this duty, stating: “[F]armers don’t have any exposure whatsoever to Chinese corn rejection. . . . they sell their corn to the elevator” who sells into a grain trader. Willing growers must decide which buyer gets their corn.”³⁸ Growers who bought Viptera are excluded from the class, and while they may be the ones whose corn commingled, they have not been sued for causing trade disruption.

Syngenta alleges that growers who know of buyers’ export-related expectations arguably have a duty to protect their own economic interests. A grower can call Syngenta or check NCGA’s “Know Before You Grow” webpage or the International Service for the Acquisition of Agri-biotech Applications (“ISAAA”) database for export approval information.

Syngenta’s failed efforts to contain its corn could give rise to liability under this “voluntary undertaking” basis for imposing a duty of care. In *McGee v. Chalfant*, the Kansas Supreme Court held that, even in the absence of a special relationship, “the actor may still be liable to third persons when he negligently performs an undertaking to render services to another which he should recognize as necessary for the protection of third persons,” as set forth in Section 324A of the Restatement of Torts. *See McGee*, 248 Kan. at 438. Plaintiffs argue that Syngenta voluntarily undertook compliance with the BIO Policy concerning the commercialization of new GM products but failed to protect the China export market.

³⁸ SYNGENTA, FIRST QUARTER 2014 SALES TRANSCRIPT 28 (2014), available at <https://www.syngenta.com/global/corporate/SiteCollectionDocuments/pdf/transcripts/q1-2014-transcript-syngenta.pdf> (quoting Michael Mack, Syngenta CEO). (last visited April 28, 2017)

In rejecting this argument, the Court in the Syngenta Corn Class Action agreed with Syngenta, finding that Section 324A cannot apply here. Plaintiffs have not sought to recover for “physical” harm and the Restatement section provides for liability “for physical harm resulting from [the actor’s] failure to exercise reasonable care to protect his undertaking,” *see* Restatement (Second) of Torts § 324A. Since the Kansas Supreme Court has specifically held that Section 324A “has application only in cases involving physical harm,” *Barber v. Williams*, 244 Kan. 318, 324 (1989), and the court found no “physical harm” from the decline in prices (as opposed to actual commingling with particular corn), the Court granted Syngenta’s motion for summary judgment with respect to any claim of negligence in which liability is based on any alleged misrepresentation, a voluntary undertaking, a failure to warn, or a duty to recall.³⁹

D. Damages

Lastly, Syngenta’s experts surely claimed, to no avail, that the lower corn prices were not impacted by loss of the Chinese market for around a year during a time of high U.S. corn production. Syngenta could also say that it had permission to market Viptera, and cite NCGA’s policy of only requiring approval from Japan and other markets with functioning regulatory systems and BIO’s policy of only requiring approval from Japan and Canada.⁴⁰

As was noted above, on June 23, 2017, the jury rendered a verdict against Syngenta for \$217.77 million finding negligence in failing to prevent disruption of the export market for US corn to China.

³⁹ In Re Syngenta AG MIR 162 Corn Litigation, MDL No. 2591 Case No. 14-md-2591-JWL (Apr. 5, 2017), https://ecf.ksd.uscourts.gov/cgi-bin/show_public_doc?2014md2591-3051 (last visited April 28, 2017).

⁴⁰ Todd Neeley, Syngenta Trial Set: Viptera Class-Action Case in June, (Feb. 2, 2017), available at <https://www.dtnpf.com/agriculture/web/ag/news/article/2017/02/02/viptera-class-action-case-summer>. (last visited Apr. 28, 2017).

E. Settlement of Grower Class Actions

In September 2017, Syngenta reached a settlement in pending grower class action cases, ending pending trials in those cases. The terms are not fully disclosed and require court approval, but the amount is reported at up to \$1.5 billion. Other pending cases outside the Multi-District Litigation do not appear to be included—for example, pending cases filed by grain traders Cargill and ADM are reportedly outside the scope of this settlement. The settlement awards in this litigation could define the boundaries of tort law in agricultural biotechnology for years to come.

III. Impact on the Biotech Innovation Pipeline

The proliferation of small start-up companies in genetic editing appears to have parallels with the long-standing innovation pipeline for biotech-derived pharmaceuticals. Small companies that lack the massive regulatory staffs and capacity for submitting data of a big biotech seed company (after consolidating, we have Bayer merging with Monsanto to emerge as Bayer, Dow absorbing Dupont to become Corteva®, and ChemChina taking over Syngenta. These “big 3” companies all have access to top-rated germplasm in agriculture, as well as regulatory expertise to offer smaller innovators in genetic editing.

As a result, the EU regulatory move will likely serve as a catalyst for moving products of little genetic editing companies into the hands of big biotech seed companies. This would parallel the biotech pharmaceutical industry, where smaller start-up innovators partnered with larger companies to ensure that the high cost of FDA and any overseas national approvals were paid for by the company with more cash on hand.

IV. Conclusion

The court decisions in these Syngenta cases many send the message that any grower or grain trader seeking a specialized market (e.g., the benefits of export markets) should maintain their own identity preserved production to avoid liability. Any failure to implement such self-imposed measures may lead to economic loss, unless a court decide for the seed company (as the court in Ohio did) and finds this loss cannot be recovered in tort against the seller of a U.S.-approved biotech crop that lacked approval in certain export markets. The decisions in cases to come from various U.S. courts will define the boundaries of tort law in agricultural biotechnology for years to come.

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APPENDIX A

Global Genetic Editing Regulatory Approaches

| Country | Status | Case -by- Case | Comments |
|----------------------|---------------|--------------------------|--|
| South America | | | |
| Argentina | Final | yes | Consultation required, depends on whether there is any new combination of DNA (transgene) |
| Chile | Final | yes | Consultation required, depends on whether there is any new combination of DNA (transgene) |
| Brazil | Final | yes | Consultation required, depends on whether there is any new combination of DNA (transgene) |
| Colombia | Proposed | yes | Consultation required, depends on whether there is any foreign genetic material |
| North America | | | |
| Canada | product based | yes | Canada does not have "GMO" laws - Uses existing regulatory framework based on novelty as trigger for pre-market assessment - no method itself is regulated; 'Novel' products of biotechnology have traits that are new, absent or outside the range for the organism. |
| US | In progress | yes (am I regulated?) | The U.S. does not have "GMO" laws but a coordinated framework; USDA has made a number of "Am I Regulated?" decisions. |
| Other | | | |
| Australia | Proposed | | Not final. Based on proposed changes to legislation (http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/amendments+proposals-1). Categorization may change in final amendments to legislation. The proposals are intended to provide an interim solution whilst broader policy considerations associated with new technologies are being progressed through a policy review (http://health.gov.au/internet/main/publishing.nsf/Content/genetechnology-review). |

| | | | |
|---------------|-------------------|--|--|
| New Zealand | Uncertain | | Currently taking a wait and see approach; previous High Court decision ruled that as currently written, gene editing techniques were not excluded from "new organisms provisions." |
| FSANZ | Code under review | | Food Safety agency for Australia and NZ |
| Israel | Final | yes | |
| Europe | | | |
| EU | Final | yes, (EJC) decision on SDN, & ODM="GMOs" | Opinion of Advocate General for EJC (1-18-2018); said genetic editing introduces foreign DNA (transgene) |
| Spain | | Yes | Dutch proposal before EJC; no other genetic material is introduced into the resulting plant than genetic material from the same plant species or from a plant species with which it can exchange genetic material through traditional breeding methods or rDNA used no longer present. |
| Netherlands | | Yes | High Council for Biotechnology Opinion. Depends on whether there is any new combination of DNA (transgene). |
| France | | Yes | Federal Office of Consumer Protection and Food Safety (BVL) opinion citing a Central Commission for biological safety (ZKBS) evaluation, since it is a targeted mutation rather than an insertion of foreign DNA. |
| Germany | | Yes | Agriculture Committee of Chamber of Deputies opinion |
| Italy | | yes | Swedish Board of Agriculture; depends on whether there is any new combination of DNA (transgene) |
| Sweden | | yes | |
| Norway | Proposed | | Norwegian Biotechnology Advisory Board proposed 3-tiered system: notification, expedited, standard assessment Opinion of Advocate General for EJC (1-18-2018); Depends on whether they introduce foreign DNA (transgene) |

Class Action Ethics Materials

The following excerpts are from the American Bar Association's Model Rules of Professional Conduct.

Rule 5.5 Unauthorized Practice Of Law; Multijurisdictional Practice Of Law

(a) A lawyer shall not practice law in a jurisdiction in violation of the regulation of the legal profession in that jurisdiction, or assist another in doing so.

(b) A lawyer who is not admitted to practice in this jurisdiction shall not:

(1) except as authorized by these Rules or other law, establish an office or other systematic and continuous presence in this jurisdiction for the practice of law; or

(2) hold out to the public or otherwise represent that the lawyer is admitted to practice law in this jurisdiction.

(c) A lawyer admitted in another United States jurisdiction, and not disbarred or suspended from practice in any jurisdiction, may provide legal services on a temporary basis in this jurisdiction that:

(1) are undertaken in association with a lawyer who is admitted to practice in this jurisdiction and who actively participates in the matter;

(2) are in or reasonably related to a pending or potential proceeding before a tribunal in this or another jurisdiction, if the lawyer, or a person the lawyer is assisting, is authorized by law or order to appear in such proceeding or reasonably expects to be so authorized;

(3) are in or reasonably related to a pending or potential arbitration, mediation, or other alternative resolution proceeding in this or another jurisdiction, if the services arise out of or are reasonably related to the lawyer's practice in a jurisdiction in which the lawyer is admitted to practice and are not services for which the forum requires pro hac vice admission; or

(4) are not within paragraphs (c) (2) or (c)(3) and arise out of or are reasonably related to the lawyer's practice in a jurisdiction in which the lawyer is admitted to practice.

(d) A lawyer admitted in another United States jurisdiction or in a foreign jurisdiction, and not disbarred or suspended from practice in any jurisdiction or the equivalent thereof, or a person otherwise lawfully practicing as an in-house counsel under the laws of a foreign jurisdiction, may provide legal services through an office or other systematic and continuous presence in this jurisdiction that:

(1) are provided to the lawyer's employer or its organizational affiliates, are not services for which the forum requires pro hac vice admission; and when performed by a foreign lawyer and requires advice on the law of this or another U.S. jurisdiction or of the United States, such advice shall be based upon the advice of a lawyer who is duly licensed and authorized by the jurisdiction to provide such advice; or

(2) are services that the lawyer is authorized by federal or other law or rule to provide in this jurisdiction.

(e) For purposes of paragraph (d):

(1) the foreign lawyer must be a member in good standing of a recognized legal profession in a foreign jurisdiction, the members of which are admitted to practice as lawyers or counselors at law or the equivalent, and subject to effective regulation and discipline by a duly constituted professional body or a public authority; or,

(2) the person otherwise lawfully practicing as an in-house counsel under the laws of a foreign jurisdiction must be authorized to practice under this rule by, in the exercise of its discretion, [the highest court of this jurisdiction].

Rule 5.5 Unauthorized Practice Of Law; Multijurisdictional Practice Of Law - Comment

[1] A lawyer may practice law only in a jurisdiction in which the lawyer is authorized to practice. A lawyer may be admitted to practice law in a jurisdiction on a regular basis or may be authorized by court rule or order or by law to practice for a limited purpose or on a restricted basis. Paragraph (a) applies to unauthorized practice of law by a lawyer, whether through the lawyer's direct action or by the lawyer assisting another person. For example, a lawyer may not assist a person in practicing law in violation of the rules governing professional conduct in that person's jurisdiction.

[2] The definition of the practice of law is established by law and varies from one jurisdiction to another. Whatever the definition, limiting the practice of law to members of the bar protects the public against rendition of legal services by unqualified persons. This Rule does not prohibit a lawyer from employing the services of paraprofessionals and delegating functions to them, so long as the lawyer supervises the delegated work and retains responsibility for their work. See Rule 5.3.

[3] A lawyer may provide professional advice and instruction to nonlawyers whose employment requires knowledge of the law; for example, claims adjusters, employees of financial or commercial institutions, social workers, accountants and persons employed in government agencies. Lawyers also may assist independent nonlawyers, such as paraprofessionals, who are authorized by the law of a jurisdiction to provide particular law-related services. In addition, a lawyer may counsel nonlawyers who wish to proceed pro se.

[4] Other than as authorized by law or this Rule, a lawyer who is not admitted to practice generally in this jurisdiction violates paragraph (b)(1) if the lawyer establishes an office or other systematic and continuous presence in this jurisdiction for the practice of law. Presence may be systematic and continuous even if the lawyer is not physically present here. Such a lawyer must not hold out to the public or otherwise represent that the lawyer is admitted to practice law in this jurisdiction. See also Rules 7.1(a) and 7.5(b).

[5] There are occasions in which a lawyer admitted to practice in another United States jurisdiction, and not disbarred or suspended from practice in any jurisdiction, may provide legal services on a temporary

basis in this jurisdiction under circumstances that do not create an unreasonable risk to the interests of their clients, the public or the courts. Paragraph (c) identifies four such circumstances. The fact that conduct is not so identified does not imply that the conduct is or is not authorized. With the exception of paragraphs (d)(1) and (d)(2), this Rule does not authorize a U.S. or foreign lawyer to establish an office or other systematic and continuous presence in this jurisdiction without being admitted to practice generally here.

[6] There is no single test to determine whether a lawyer's services are provided on a "temporary basis" in this jurisdiction, and may therefore be permissible under paragraph (c). Services may be "temporary" even though the lawyer provides services in this jurisdiction on a recurring basis, or for an extended period of time, as when the lawyer is representing a client in a single lengthy negotiation or litigation.

[7] Paragraphs (c) and (d) apply to lawyers who are admitted to practice law in any United States jurisdiction, which includes the District of Columbia and any state, territory or commonwealth of the United States. Paragraph (d) also applies to lawyers admitted in a foreign jurisdiction. The word "admitted" in paragraphs (c), (d) and (e) contemplates that the lawyer is authorized to practice in the jurisdiction in which the lawyer is admitted and excludes a lawyer who while technically admitted is not authorized to practice, because, for example, the lawyer is on inactive status.

[8] Paragraph (c)(1) recognizes that the interests of clients and the public are protected if a lawyer admitted only in another jurisdiction associates with a lawyer licensed to practice in this jurisdiction. For this paragraph to apply, however, the lawyer admitted to practice in this jurisdiction must actively participate in and share responsibility for the representation of the client.

[9] Lawyers not admitted to practice generally in a jurisdiction may be authorized by law or order of a tribunal or an administrative agency to appear before the tribunal or agency. This authority may be granted pursuant to formal rules governing admission pro hac vice or pursuant to informal practice of the tribunal or agency. Under paragraph (c)(2), a lawyer does not violate this Rule when the lawyer appears before a tribunal or agency pursuant to such authority. To the extent that a court rule or other law of this jurisdiction requires a lawyer who is not admitted to practice in this jurisdiction to obtain admission pro hac vice before appearing before a tribunal or administrative agency, this Rule requires the lawyer to obtain that authority.

[10] Paragraph (c)(2) also provides that a lawyer rendering services in this jurisdiction on a temporary basis does not violate this Rule when the lawyer engages in conduct in anticipation of a proceeding or hearing in a jurisdiction in which the lawyer is authorized to practice law or in which the lawyer reasonably expects to be admitted pro hac vice. Examples of such conduct include meetings with the client, interviews of potential witnesses, and the review of documents. Similarly, a lawyer admitted only in another jurisdiction may engage in conduct temporarily in this jurisdiction in connection with pending litigation in another jurisdiction in which the lawyer is or reasonably expects to be authorized to appear, including taking depositions in this jurisdiction.

[11] When a lawyer has been or reasonably expects to be admitted to appear before a court or administrative agency, paragraph (c)(2) also permits conduct by lawyers who are associated with that lawyer in the matter, but who do not expect to appear before the court or administrative agency. For example, subordinate lawyers may conduct research, review documents, and attend meetings with witnesses in support of the lawyer responsible for the litigation.

[12] Paragraph (c)(3) permits a lawyer admitted to practice law in another jurisdiction to perform services on a temporary basis in this jurisdiction if those services are in or reasonably related to a pending or potential arbitration, mediation, or other alternative dispute resolution proceeding in this or another jurisdiction, if the services arise out of or are reasonably related to the lawyer's practice in a jurisdiction in which the lawyer is admitted to practice. The lawyer, however, must obtain admission pro hac vice in the case of a court-annexed arbitration or mediation or otherwise if court rules or law so require.

[13] Paragraph (c)(4) permits a lawyer admitted in another jurisdiction to provide certain legal services on a temporary basis in this jurisdiction that arise out of or are reasonably related to the lawyer's practice in a jurisdiction in which the lawyer is admitted but are not within paragraphs (c)(2) or (c)(3). These services include both legal services and services that nonlawyers may perform but that are considered the practice of law when performed by lawyers.

[14] Paragraphs (c)(3) and (c)(4) require that the services arise out of or be reasonably related to the lawyer's practice in a jurisdiction in which the lawyer is admitted. A variety of factors evidence such a relationship. The lawyer's client may have been previously represented by the lawyer, or may be resident in or have substantial contacts with the jurisdiction in which the lawyer is admitted. The matter, although involving other jurisdictions, may have a significant connection with that jurisdiction. In other cases, significant aspects of the lawyer's work might be conducted in that jurisdiction or a significant aspect of the matter may involve the law of that jurisdiction. The necessary relationship might arise when the client's activities or the legal issues involve multiple jurisdictions, such as when the officers of a multinational corporation survey potential business sites and seek the services of their lawyer in assessing the relative merits of each. In addition, the services may draw on the lawyer's recognized expertise developed through the regular practice of law on behalf of clients in matters involving a particular body of federal, nationally-uniform, foreign, or international law. Lawyers desiring to provide pro bono legal services on a temporary basis in a jurisdiction that has been affected by a major disaster, but in which they are not otherwise authorized to practice law, as well as lawyers from the affected jurisdiction who seek to practice law temporarily in another jurisdiction, but in which they are not otherwise authorized to practice law, should consult the [Model Court Rule on Provision of Legal Services Following Determination of Major Disaster].

[15] Paragraph (d) identifies two circumstances in which a lawyer who is admitted to practice in another United States or a foreign jurisdiction, and is not disbarred or suspended from practice in any jurisdiction, or the equivalent thereof, may establish an office or other systematic and continuous presence in this jurisdiction for the practice of law. Pursuant to paragraph (c) of this Rule, a lawyer admitted in any U.S. jurisdiction may also provide legal services in this jurisdiction on a temporary basis. See also Model Rule on Temporary Practice by Foreign Lawyers. Except as provided in paragraphs (d)(1) and (d)(2), a lawyer who is admitted to practice law in another United States or foreign jurisdiction and who establishes an office or other systematic or continuous presence in this jurisdiction must become admitted to practice law generally in this jurisdiction.

[16] Paragraph (d)(1) applies to a U.S. or foreign lawyer who is employed by a client to provide legal services to the client or its organizational affiliates, i.e., entities that control, are controlled by, or are under common control with the employer. This paragraph does not authorize the provision of personal legal services to the employer's officers or employees. The paragraph applies to in-house corporate

lawyers, government lawyers and others who are employed to render legal services to the employer. The lawyer's ability to represent the employer outside the jurisdiction in which the lawyer is licensed generally serves the interests of the employer and does not create an unreasonable risk to the client and others because the employer is well situated to assess the lawyer's qualifications and the quality of the lawyer's work. To further decrease any risk to the client, when advising on the domestic law of a United States jurisdiction or on the law of the United States, the foreign lawyer authorized to practice under paragraph (d)(1) of this Rule needs to base that advice on the advice of a lawyer licensed and authorized by the jurisdiction to provide it.

[17] If an employed lawyer establishes an office or other systematic presence in this jurisdiction for the purpose of rendering legal services to the employer, the lawyer may be subject to registration or other requirements, including assessments for client protection funds and mandatory continuing legal education. See Model Rule for Registration of In-House Counsel.

[18] Paragraph (d)(2) recognizes that a U.S. or foreign lawyer may provide legal services in a jurisdiction in which the lawyer is not licensed when authorized to do so by federal or other law, which includes statute, court rule, executive regulation or judicial precedent. See, e.g., Model Rule on Practice Pending Admission.

[19] A lawyer who practices law in this jurisdiction pursuant to paragraphs (c) or (d) or otherwise is subject to the disciplinary authority of this jurisdiction. See Rule 8.5(a).

[20] In some circumstances, a lawyer who practices law in this jurisdiction pursuant to paragraphs (c) or (d) may have to inform the client that the lawyer is not licensed to practice law in this jurisdiction. For example, that may be required when the representation occurs primarily in this jurisdiction and requires knowledge of the law of this jurisdiction. See Rule 1.4(b).

[21] Paragraphs (c) and (d) do not authorize communications advertising legal services in this jurisdiction by lawyers who are admitted to practice in other jurisdictions. Whether and how lawyers may communicate the availability of their services in this jurisdiction is governed by Rules 7.1 to 7.5.

Rule 7.3 Solicitation of Clients

(a) A lawyer shall not by in-person, live telephone or real-time electronic contact solicit professional employment when a significant motive for the lawyer's doing so is the lawyer's pecuniary gain, unless the person contacted:

(1) is a lawyer; or

(2) has a family, close personal, or prior professional relationship with the lawyer.

(b) A lawyer shall not solicit professional employment by written, recorded or electronic communication or by in-person, telephone or real-time electronic contact even when not otherwise prohibited by paragraph (a), if:

(1) the target of the solicitation has made known to the lawyer a desire not to be solicited by the lawyer; or

(2) the solicitation involves coercion, duress or harassment.

(c) Every written, recorded or electronic communication from a lawyer soliciting professional employment from anyone known to be in need of legal services in a particular matter shall include the words "Advertising Material" on the outside envelope, if any, and at the beginning and ending of any recorded or electronic communication, unless the recipient of the communication is a person specified in paragraphs (a)(1) or (a)(2).

(d) Notwithstanding the prohibitions in paragraph (a), a lawyer may participate with a prepaid or group legal service plan operated by an organization not owned or directed by the lawyer that uses in-person or telephone contact to solicit memberships or subscriptions for the plan from persons who are not known to need legal services in a particular matter covered by the plan.

Rule 7.3 Solicitation of Clients - Comment

[1] A solicitation is a targeted communication initiated by the lawyer that is directed to a specific person and that offers to provide, or can reasonably be understood as offering to provide, legal services. In contrast, a lawyer's communication typically does not constitute a solicitation if it is directed to the general public, such as through a billboard, an Internet banner advertisement, a website or a television commercial, or if it is in response to a request for information or is automatically generated in response to Internet searches.

[2] There is a potential for abuse when a solicitation involves direct in-person, live telephone or real-time electronic contact by a lawyer with someone known to need legal services. These forms of contact subject a person to the private importuning of the trained advocate in a direct interpersonal encounter. The person, who may already feel overwhelmed by the circumstances giving rise to the need for legal services, may find it difficult fully to evaluate all available alternatives with reasoned judgment and appropriate self-interest in the face of the lawyer's presence and insistence upon being retained immediately. The situation is fraught with the possibility of undue influence, intimidation, and over-reaching.

[3] This potential for abuse inherent in direct in-person, live telephone or real-time electronic solicitation justifies its prohibition, particularly since lawyers have alternative means of conveying necessary information to those who may be in need of legal services. In particular, communications can be mailed or transmitted by email or other electronic means that do not involve real-time contact and do not violate other laws governing solicitations. These forms of communications and solicitations make it possible for the public to be informed about the need for legal services, and about the qualifications of available lawyers and law firms, without subjecting the public to direct in-person, telephone or real-time electronic persuasion that may overwhelm a person's judgment.

[4] The use of general advertising and written, recorded or electronic communications to transmit information from lawyer to the public, rather than direct in-person, live telephone or real-time electronic contact, will help to assure that the information flows cleanly as well as freely. The contents of advertisements and communications permitted under Rule 7.2 can be permanently recorded so that they cannot be disputed and may be shared with others who know the lawyer. This potential for informal review is itself likely to help guard against statements and claims that might constitute false

and misleading communications, in violation of Rule 7.1. The contents of direct in-person, live telephone or real-time electronic contact can be disputed and may not be subject to third-party scrutiny. Consequently, they are much more likely to approach (and occasionally cross) the dividing line between accurate representations and those that are false and misleading.

[5] There is far less likelihood that a lawyer would engage in abusive practices against a former client, or a person with whom the lawyer has a close personal or family relationship, or in situations in which the lawyer is motivated by considerations other than the lawyer's pecuniary gain. Nor is there a serious potential for abuse when the person contacted is a lawyer. Consequently, the general prohibition in Rule 7.3(a) and the requirements of Rule 7.3(c) are not applicable in those situations. Also, paragraph (a) is not intended to prohibit a lawyer from participating in constitutionally protected activities of public or charitable legal- service organizations or bona fide political, social, civic, fraternal, employee or trade organizations whose purposes include providing or recommending legal services to their members or beneficiaries.

[6] But even permitted forms of solicitation can be abused. Thus, any solicitation which contains information which is false or misleading within the meaning of Rule 7.1, which involves coercion, duress or harassment within the meaning of Rule 7.3(b)(2), or which involves contact with someone who has made known to the lawyer a desire not to be solicited by the lawyer within the meaning of Rule 7.3(b)(1) is prohibited. Moreover, if after sending a letter or other communication as permitted by Rule 7.2 the lawyer receives no response, any further effort to communicate with the recipient of the communication may violate the provisions of Rule 7.3(b).

[7] This Rule is not intended to prohibit a lawyer from contacting representatives of organizations or groups that may be interested in establishing a group or prepaid legal plan for their members, insureds, beneficiaries or other third parties for the purpose of informing such entities of the availability of and details concerning the plan or arrangement which the lawyer or lawyer's firm is willing to offer. This form of communication is not directed to people who are seeking legal services for themselves. Rather, it is usually addressed to an individual acting in a fiduciary capacity seeking a supplier of legal services for others who may, if they choose, become prospective clients of the lawyer. Under these circumstances, the activity which the lawyer undertakes in communicating with such representatives and the type of information transmitted to the individual are functionally similar to and serve the same purpose as advertising permitted under Rule 7.2.

[8] The requirement in Rule 7.3(c) that certain communications be marked "Advertising Material" does not apply to communications sent in response to requests of potential clients or their spokespersons or sponsors. General announcements by lawyers, including changes in personnel or office location, do not constitute communications soliciting professional employment from a client known to be in need of legal services within the meaning of this Rule.

[9] Paragraph (d) of this Rule permits a lawyer to participate with an organization which uses personal contact to solicit members for its group or prepaid legal service plan, provided that the personal contact is not undertaken by any lawyer who would be a provider of legal services through the plan. The organization must not be owned by or directed (whether as manager or otherwise) by any lawyer or law firm that participates in the plan. For example, paragraph (d) would not permit a lawyer to create an organization controlled directly or indirectly by the lawyer and use the organization for the in-person or telephone solicitation of legal employment of the lawyer through memberships in the plan or otherwise.

The communication permitted by these organizations also must not be directed to a person known to need legal services in a particular matter, but is to be designed to inform potential plan members generally of another means of affordable legal services. Lawyers who participate in a legal service plan must reasonably assure that the plan sponsors are in compliance with Rules 7.1, 7.2 and 7.3(b). See 8.4(a).

Rule 4.2 Communication With Person Represented By Counsel

In representing a client, a lawyer shall not communicate about the subject of the representation with a person the lawyer knows to be represented by another lawyer in the matter, unless the lawyer has the consent of the other lawyer or is authorized to do so by law or a court order.

Rule 4.2 Communication With Person Represented By Counsel - Comment

[1] This Rule contributes to the proper functioning of the legal system by protecting a person who has chosen to be represented by a lawyer in a matter against possible overreaching by other lawyers who are participating in the matter, interference by those lawyers with the client-lawyer relationship and the uncounselled disclosure of information relating to the representation.

[2] This Rule applies to communications with any person who is represented by counsel concerning the matter to which the communication relates.

[3] The Rule applies even though the represented person initiates or consents to the communication. A lawyer must immediately terminate communication with a person if, after commencing communication, the lawyer learns that the person is one with whom communication is not permitted by this Rule.

[4] This Rule does not prohibit communication with a represented person, or an employee or agent of such a person, concerning matters outside the representation. For example, the existence of a controversy between a government agency and a private party, or between two organizations, does not prohibit a lawyer for either from communicating with nonlawyer representatives of the other regarding a separate matter. Nor does this Rule preclude communication with a represented person who is seeking advice from a lawyer who is not otherwise representing a client in the matter. A lawyer may not make a communication prohibited by this Rule through the acts of another. See Rule 8.4(a). Parties to a matter may communicate directly with each other, and a lawyer is not prohibited from advising a client concerning a communication that the client is legally entitled to make. Also, a lawyer having independent justification or legal authorization for communicating with a represented person is permitted to do so.

[5] Communications authorized by law may include communications by a lawyer on behalf of a client who is exercising a constitutional or other legal right to communicate with the government. Communications authorized by law may also include investigative activities of lawyers representing governmental entities, directly or through investigative agents, prior to the commencement of criminal or civil enforcement proceedings. When communicating with the accused in a criminal matter, a government lawyer must comply with this Rule in addition to honoring the constitutional rights of the

accused. The fact that a communication does not violate a state or federal constitutional right is insufficient to establish that the communication is permissible under this Rule.

[6] A lawyer who is uncertain whether a communication with a represented person is permissible may seek a court order. A lawyer may also seek a court order in exceptional circumstances to authorize a communication that would otherwise be prohibited by this Rule, for example, where communication with a person represented by counsel is necessary to avoid reasonably certain injury.

[7] In the case of a represented organization, this Rule prohibits communications with a constituent of the organization who supervises, directs or regularly consults with the organization's lawyer concerning the matter or has authority to obligate the organization with respect to the matter or whose act or omission in connection with the matter may be imputed to the organization for purposes of civil or criminal liability. Consent of the organization's lawyer is not required for communication with a former constituent. If a constituent of the organization is represented in the matter by his or her own counsel, the consent by that counsel to a communication will be sufficient for purposes of this Rule. Compare Rule 3.4(f). In communicating with a current or former constituent of an organization, a lawyer must not use methods of obtaining evidence that violate the legal rights of the organization. See Rule 4.4.

[8] The prohibition on communications with a represented person only applies in circumstances where the lawyer knows that the person is in fact represented in the matter to be discussed. This means that the lawyer has actual knowledge of the fact of the representation; but such actual knowledge may be inferred from the circumstances. See Rule 1.0(f). Thus, the lawyer cannot evade the requirement of obtaining the consent of counsel by closing eyes to the obvious.

[9] In the event the person with whom the lawyer communicates is not known to be represented by counsel in the matter, the lawyer's communications are subject to Rule 4.3.

Rule 1.8 Conflict Of Interest: Current Clients: Specific Rules

(g) A lawyer who represents two or more clients shall not participate in making an aggregate settlement of the claims of or against the clients, or in a criminal case an aggregated agreement as to guilty or nolo contendere pleas, unless each client gives informed consent, in a writing signed by the client. The lawyer's disclosure shall include the existence and nature of all the claims or pleas involved and of the participation of each person in the settlement.

Rule 1.8 Conflict Of Interest: Current Clients: Specific Rules - Comment

Aggregate Settlements

[13] Differences in willingness to make or accept an offer of settlement are among the risks of common representation of multiple clients by a single lawyer. Under Rule 1.7, this is one of the risks that should be discussed before undertaking the representation, as part of the process of obtaining the clients' informed consent. In addition, Rule 1.2(a) protects each client's right to have the final say in deciding whether to accept or reject an offer of settlement and in deciding whether to enter a guilty or nolo contendere plea in a criminal case. The rule stated in this paragraph is a corollary of both these Rules

and provides that, before any settlement offer or plea bargain is made or accepted on behalf of multiple clients, the lawyer must inform each of them about all the material terms of the settlement, including what the other clients will receive or pay if the settlement or plea offer is accepted. See also Rule 1.0(e) (definition of informed consent). Lawyers representing a class of plaintiffs or defendants, or those proceeding derivatively, may not have a full client-lawyer relationship with each member of the class; nevertheless, such lawyers must comply with applicable rules regulating notification of class members and other procedural requirements designed to ensure adequate protection of the entire class.