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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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- aa1 Senior Staff Attorney, National Agricultural Law Center, University of Arkansas.
- 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>.

39 UARLR 389



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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.

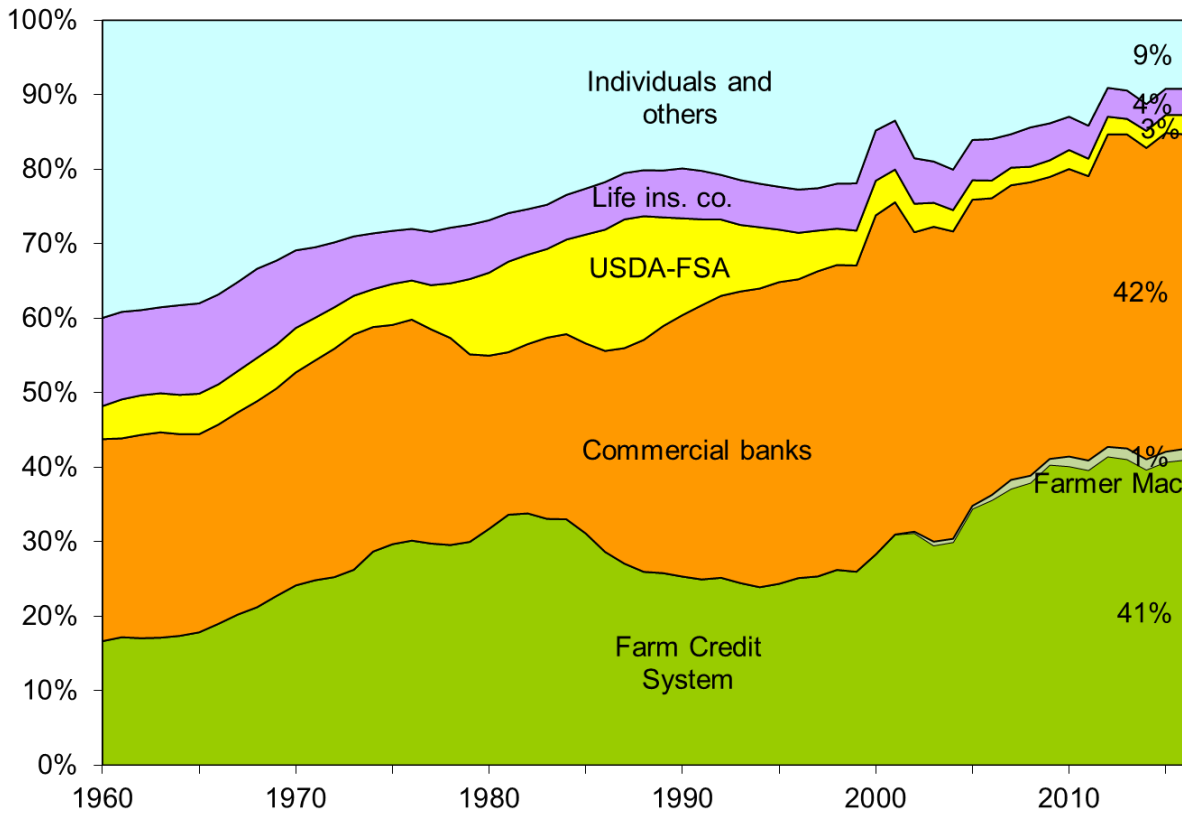
The total amount of farm debt (\$374 billion at the end of 2016) is concentrated relatively more in real estate debt (60%) than in non-real estate debt (40%). FCS is the largest lender for real estate (46%), and both commercial banks' and FCS's shares have grown as others' shares have decreased (**Figure 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

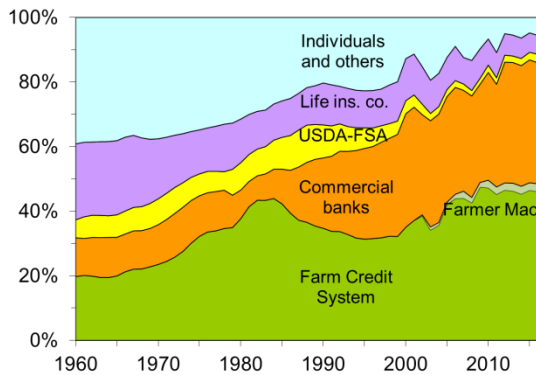


Source: CRS, using USDA Economic Research Service (ERS) year-end data at <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics.aspx>.

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

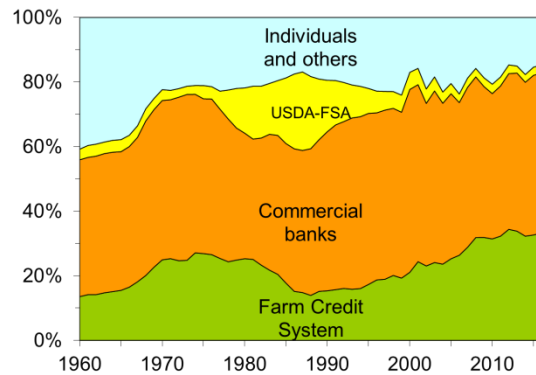
(60% of total farm debt in 2016)



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>.

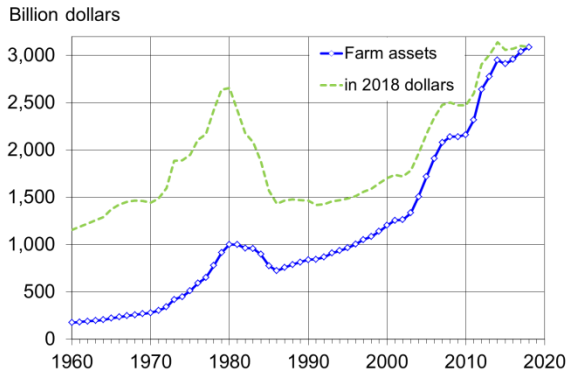
⁴ ERS, *Farm Income and Wealth Statistics*, <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics.aspx>.

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*.

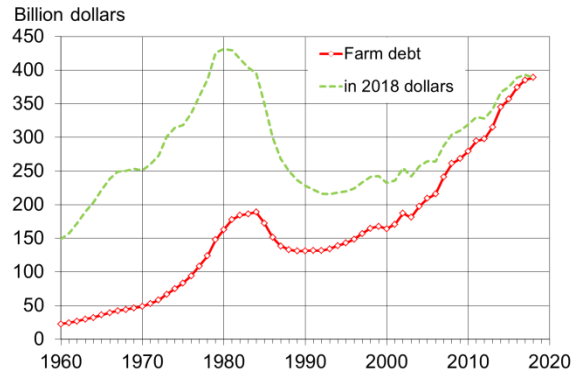
⁷ Federal Reserve Bank of Chicago, *AgConditions*, February 2018, <https://www.chicagofed.org/research/data/ag-conditions/index>.

Figure 4. Farm Assets, 1960-2018



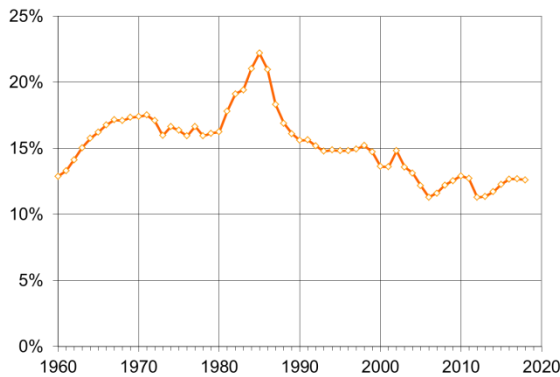
Source: CRS, using ERS data.
Notes: 2018 forecast.

Figure 5. Farm Debt, 1960-2018



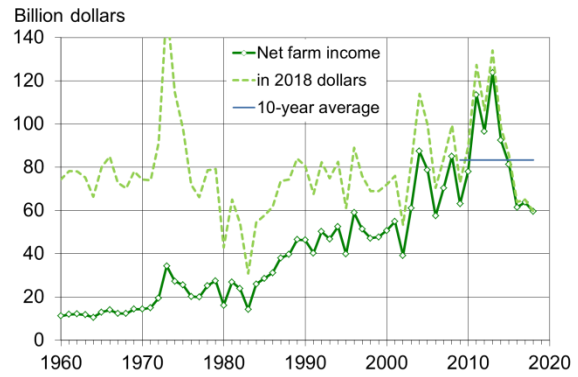
Source: CRS, using ERS data.
Notes: 2018 forecast.

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



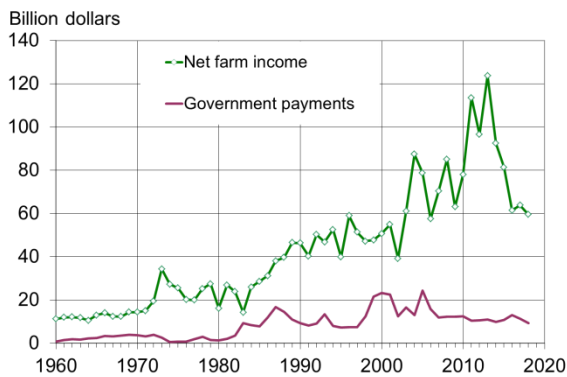
Source: CRS, using ERS data.
Notes: 2018 forecast.

Figure 7. Net Farm Income, 1960-2018



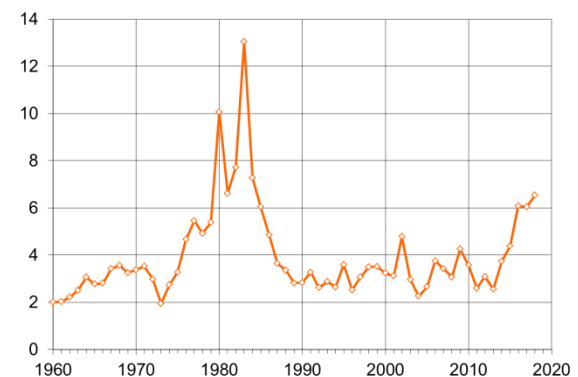
Source: CRS, using ERS data.
Notes: 2018 forecast.

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

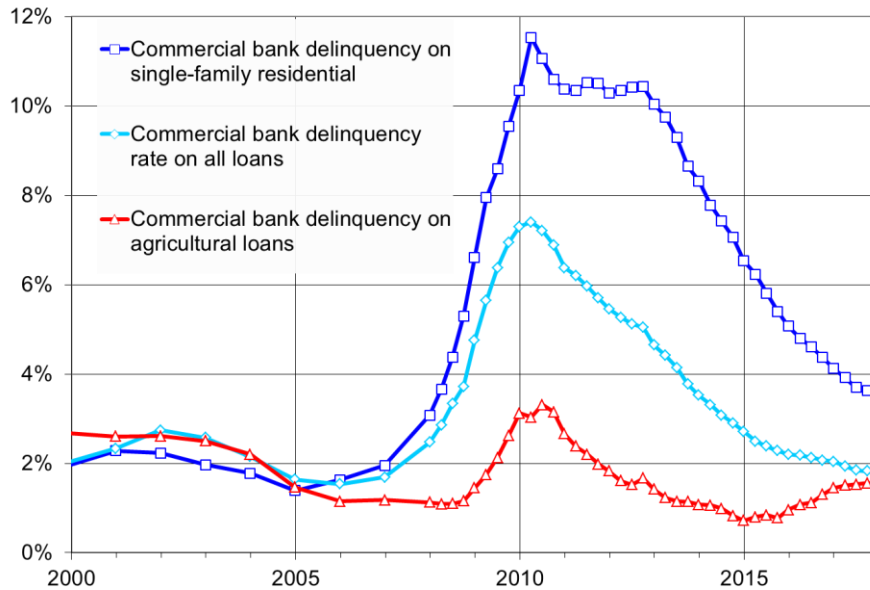
At commercial banks, nonperforming farm loans rose during the 2008-2010 financial crisis, recovered into 2015, but have risen again as declining farm income has stressed repayment. Nonperforming farm real estate loans at commercial banks rose from a low of 0.7% in December 2006 to 2.9% in March 2011 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>.

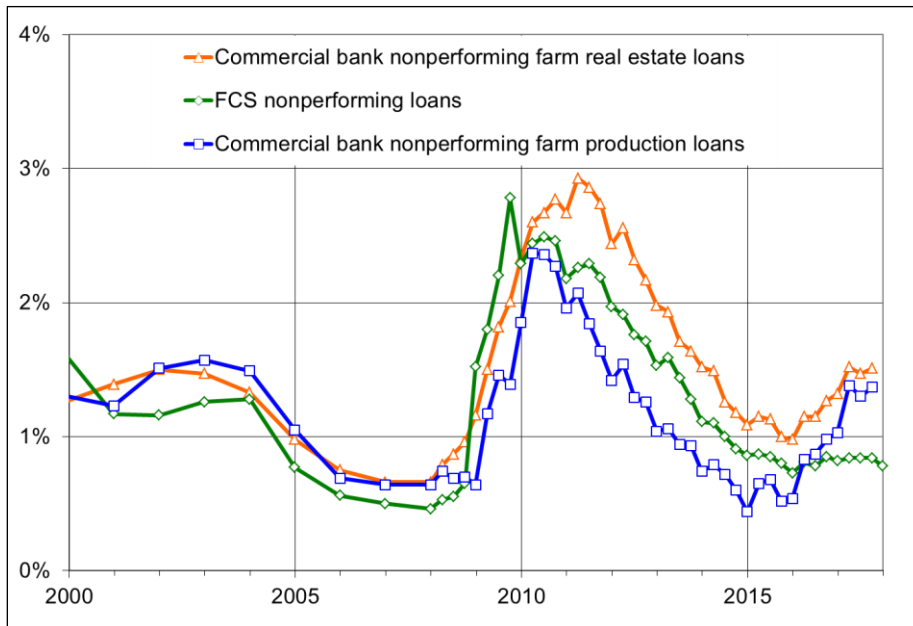
Figure 10. Delinquency Rates on Commercial Bank Loans, 2000-2017Q4



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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