



Animal Welfare
Institute

*The following report is no longer current, and is
to be used for historical purposes only.
Please see AWI's most recent report, [available here](#).*



Animal Welfare
Institute

Barn Fires: A Deadly Threat to Farm Animals



SHANE MURPHY



Animal Welfare Institute

Since its founding in 1951, the Animal Welfare Institute has been alleviating suffering inflicted on animals by people. AWI works to improve conditions for the billions of animals raised and slaughtered each year for food in the United States. Major goals of the organization include eliminating factory farms, supporting higher-welfare family farms, and achieving humane transport and slaughter conditions for all farm animals.

Barn Fires: A Deadly Threat to Farm Animals

In This Report •

- 1 EXECUTIVE SUMMARY
- 2 INTRODUCTION TO BARN FIRES IN THE UNITED STATES
- 2 BARN FIRES BY THE NUMBERS
- 4 THE PROBLEM OF BARN FIRES AT INDUSTRIAL OPERATIONS
- 6 STATE-BY-STATE REPORTS
- 7 CAUSES OF BARN FIRES
- 8 SEASONALITY OF BARN FIRES
- 8 FINANCIAL COSTS OF BARN FIRES
- 9 ENTITIES RESPONSIBLE FOR MONITORING AND REPORTING BARN FIRES
- 11 EXISTING FIRE PROTECTION FOR CONFINED ANIMALS
- 13 RECOMMENDATIONS
- 16 APPENDIX
- 20 REFERENCES

January 2022 (2nd edition)

About the Research •

This report presents an analysis of data compiled from barn fires that occurred over a period of four years, from 2018 to 2021. Information on barn fires was obtained via media reports and public records provided by the Federal Emergency Management Agency (FEMA) through the Freedom of Information Act (FOIA). The term “barn” includes industrial confinement sheds typically associated with concentrated animal feeding operations (CAFOs) in addition to the more traditional barns commonly seen on family farms. Because laws and regulations vary from state to state, and municipalities are not generally required to report barn fires and livestock losses that occur within their boundaries, we acknowledge that there are unreported fires and animal deaths that our analysis does not account for.

This Animal Welfare Institute (AWI) report was prepared by Allie Granger, Farm Animal Program Policy Associate, with assistance from Dena Jones, Farm Animal Program Director, and AWI policy interns Marissa Boland, Samantha Maybury, and Lucía Chambi.



Executive Summary •

This report explores the prevalence and causes of farm animal deaths due to barn fires in the United States. AWI tracked and compiled information on barn fires over a four-year period in order to determine why they occur, how frequently farm animals die as a result, and how barn fires can be prevented. This is an update of a 2018 AWI report, and represents the second edition of the first ever report conducted to quantify farm animal losses from barn fires across the United States.

Key findings include:

- From 2018 to 2021, at least 2,992,867 farm animals died as a result of barn fires. Due to unreported fires, it is likely that the number of deaths is significantly higher.
- Improper use of or malfunctioning heating devices and other electrical malfunctions



MATEUS BANDEIRA

were suspected or determined to be the culprit in a large majority of barn fires.

- While many barn fires occurred in states with the most significant animal agriculture production, a disproportionate number occurred in northeastern and midwestern states with lower levels of animal agriculture production. This suggests that colder weather was a greater factor in the prevalence of barn fires than the intensity of a state's animal agriculture production.
- A state's overall intensity of production was also not a primary factor in total number of deaths, but weather was not a determining factor, either. Rather, what distinguished those states with the highest number of deaths via barn fires is that, in most, one or two catastrophic fires took the lives of hundreds of thousands of animals at once and accounted for nearly the entire death toll in the state.
- The 10 largest fires that occurred between 2018 and 2021 (roughly 2 percent of the total number of barn fires during this period) are responsible for the deaths of about 75 percent of the total number of animals killed. All 10 of these fires involved chickens.
- The number of bird deaths per year vastly outnumbered those of other species. Of the nearly 3 million farm animals killed in barn fires during the time period studied, nearly 98 percent were poultry, with egg-laying hens accounting for the largest share of fatalities, followed by chickens raised for meat.
- There are no federal laws in the United States specifically designed to protect farm animals from barn fires, and only a few states have adopted NFPA 150, Fire and Life Safety in Animal Housing Facilities Code—a standard that offers some level of protection for farm animals.

Introduction to Barn Fires in the United States •

It is horrific when an animal dies in a fire. Whether it's a calf lost in a barn fire or a racehorse who didn't survive a stable fire, the loss of life in this manner is something no one ever wants to see. However, the sad reality is that hundreds of thousands of animals die from fires every year because of the lack of mandated fire protection in barns and industrial farms. Because farm animals are raised for food, their deaths may not be publicized as widely as a fire at a zoo or an animal shelter, but barn fires wreak havoc on animals and farm owners alike. Trapped inside burning barns and enclosures, farm animals struggle helplessly to escape as they endure unimaginable suffering. Some die almost immediately as the fire burns through the barn; others may initially survive the fire but must be euthanized because their bodies have been severely burned.

No farm is immune from the devastation that a barn fire can bring; these incidents range in size from one animal death at small, family-owned farms or in backyard flocks to large-scale fires killing hundreds of thousands of animals at an industrial facility. While many fires could be prevented with proper inspection, maintenance, and detection systems, only a few states across the country have adopted codes that specifically require fire protection measures in barns.

Given the limited legal protections available for farm animals—both generally and as it relates to fire prevention—and the lack of reporting requirements nationwide, it is unfortunate but no surprise that farm animal fatalities have flown under the radar and have not been prioritized. However, with comprehensive data, the political will to act, and a few significant changes made by industry groups and farm owners alike, thousands of farm animals every year could avoid the terrible fate of perishing in barn fires.

Barn Fires by the Numbers •

A tally of the numbers of barn fires and animal deaths that occurred over the past five years in the United States, based on media reports, is shown below. It is likely, however, that the actual number is much higher due to barn fires that go unreported in the media.

The total number of animals reportedly killed per year varied greatly; 2018 accounted for only about 5 percent of the total, whereas 2020 accounted for nearly 56 percent, despite having just over half the number of fires as 2018. In 2020, however, five exceptionally large fires on commercial egg operations accounted for over 1.5 million fatalities combined. In 2019, one large fire killed 250,000 chickens, and in 2021, the two largest fires combined to kill 366,000 chickens—substantially increasing the total fatalities in those years. In contrast, although 2018 had a significant number of barn fires, the largest killed 50,000 animals.

Between 2018 and 2021, the average number of animals killed in barn fires a year was over 748,000 animals, compared to the yearly average of about 552,000 farm animal deaths during the last period studied by AWI (2013–2017).

DEADLY BARN FIRES PER YEAR

2018 → 156

2019 → 182

2020 → 88

2021 → 113

Total: 539

FARM ANIMALS KILLED PER YEAR

2018 → 157,302

2019 → 478,545

2020 → 1,675,195

2021 → 681,825

Total: 2,992,867

SPECIES OF ANIMAL

Eighteen species of animals were reported to have died in barn fires from 2018 to 2021. The vast majority of those animals were chickens. This is most likely because chickens raised in industrial settings are densely packed into sheds, at much higher numbers than other farm animal species. Additionally, chickens account for almost 96 percent of all farm animals raised for food in the United States each year, so as tragic as it may be, it is not surprising they are killed in these incidents at a similar level. During the period surveyed, there were several instances in which 100,000 to 400,000 chickens were killed in a single fire, whereas the largest number of cows killed in a single fire was 548 and the largest number of pigs was 12,000.

As previously mentioned, the total number of farm animals killed (shown at right) is an estimate based on media reports that often don't provide full data on the number or species of animals killed. In cases where a nonspecific number of animals was reported (e.g., "10–20 pigs"), the most conservative number was used when tallying animal deaths. When the species of animals killed were not identified, or in cases where multiple species were involved and an exact numerical breakdown for the deaths was not provided (e.g., "numerous farm animals" or "40 chickens, ducks, rabbits, and pigs"), these incidents were recorded under the "Species Not Specified" category.

| | | |
|--|-----------|-----|
| Chickens | 2,758,950 | 92% |
| Turkeys | 112,945 | 4% |
| Other Birds (Ducks, Geese, Quail, Pheasants, Guinea Hens, Peacocks) | 49,684 | 2% |
| Pigs | 63,208 | 2% |
| Cows | 3,912 | <1% |
| Goats, Sheep | 2,154 | <1% |
| Horses, Alpacas, Rabbits, Donkeys, Cats, Dogs | 786 | <1% |
| Species Not Specified | 1,228 | <1% |



JACK TUMMERS

The Problem of Barn Fires at Industrial Operations •

The extraordinary number of animal lives lost in just a four-year period highlights the need for fire protection at industrial animal housing facilities, particularly commercial egg and broiler operations, where one fire can—and has—killed more animals in a day than all of the fires combined from another year. In order to have the biggest impact on animal welfare and reduce the number of animals killed in this horrific manner, this problem must be addressed by the country's largest poultry and livestock farms. Until industry groups start taking this problem seriously by calling on their members to implement fire prevention and suppression mechanisms across the sector, we will continue to see hundreds of thousands of animals burned alive each year. If any one of these six farms highlighted at right had comprehensive fire prevention measures in place, many animals could have been spared tremendous suffering.

BARN FIRES AT POULTRY OPERATIONS

Considering how densely chickens are packed into industrial barns, it is no surprise that the six fires killing the most animals occurred at commercial egg operations, with the victims being egg-laying hens. During the four-year period studied, we also observed what appeared to be a rise in fires at industrial-scale cage-free egg production facilities. In fact, five of the six largest fires highlighted at right occurred at cage-free operations. Between 2018 and 2021, nearly 1.8 million cage-free hens were killed. An exact cause was not determined in most of these incidents, though it is possible that environmental factors associated with the nature of cage-free housing within industrial facilities contributed to these fires. Scientific research has documented dust levels up to nine times higher in cage-free housing compared to cage housing, so it seems likely that increased dust, alone or in combination with litter, may give rise to the number and severity of fires in large, crowded cage-free barns.¹

1. February 27, 2020²
Michael Foods
Bloomfield, Nebraska
400,000 chickens
2. January 3, 2020³
Vande Bunte Eggs
Ostego Township, Michigan
300,000 chickens
3. April 23, 2020⁴
Gemperle Farms
Stanislaus County, California
280,000 chickens
4. July 20, 2020⁵
Red Bird Egg Farm
Pilesgrove, New Jersey
280,000 chickens
5. April 30, 2019⁶
Herbruck's Poultry Ranch
Ionia County, Michigan
250,000 chickens
6. December 17, 2020⁷
Cal-Maine Foods
Dade City, Florida
250,000 chickens

Though the number of egg-laying hens killed in fires is certainly the highest, the number of chickens raised for meat (referred to in the industry as “broiler chickens”), is also substantial. During the four-year period studied, more than 326,000 broiler chickens were killed in fires across the country. Fires at large broiler operations typically involved fewer animals than those at commercial egg farms, but the largest of these incidents still involved anywhere from 9,000 to 64,000 animals at once.



The aftermath of a fire in a chicken confinement shed.



BARN FIRES AT PIG OPERATIONS

Similar to poultry, pigs raised for meat are often packed into barns by the thousands, where they spend the majority of their lives without access to the outdoors. Such extreme confinement within massive buildings provides the animals no opportunity to escape during an emergency; once a fire ignites in the barn, high mortality is inevitable. Provided below are the five worst fires that occurred on pig confinement operations between 2018 and 2021, which together resulted in the tragic fire-related deaths of nearly 42,000 pigs.

1. May 16, 2021⁸
Woodville Pork
Waseca County, Minnesota
12,000 pigs
2. January 12, 2021⁹
Unidentified farm
Gila, Illinois
10,000 pigs
3. May 12, 2021¹⁰
Pillen Family Farm
Boone County, Nebraska
10,000 pigs
4. June 19, 2018¹¹
Unidentified farm
Fayette County, Ohio
5,000 pigs
5. August 7, 2020¹²
Unidentified farm
Pipestone County, Minnesota
4,800 pigs

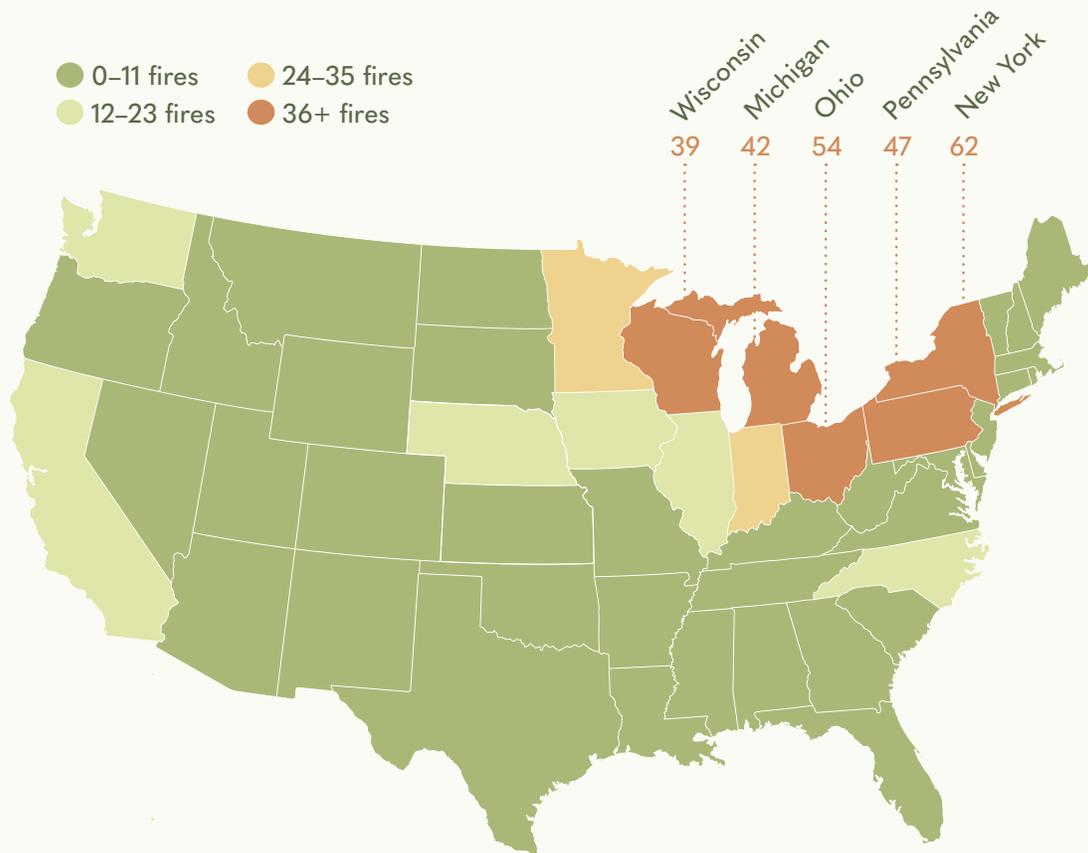
State-By-State Reports •

Barn fires that killed farm animals were reported in 46 states from 2018 to 2021. While one might expect that the states with the most animal agriculture would have the highest number of fires, that is generally not the case. Georgia, for instance, which has the largest broiler chicken industry, comprising over 2,200 farms, reported only four barn fires during the four-year period.¹³ Additionally, Iowa, which is both the largest egg-producing state and largest pork-producing state in the country reported fewer than 20 barn fires over the four-year span—far lower than several other states.¹⁴

Instead, a more prominent factor with respect to number of fires appears to be weather. Colder states experience more barn fires, regardless of whether they are top producers.

As demonstrated by the graphic below, states reporting the most barn fires were concentrated in the midwestern and northeastern areas of the country, while warmer southern states with significant animal agriculture industries consistently had fewer fatal barn fires.

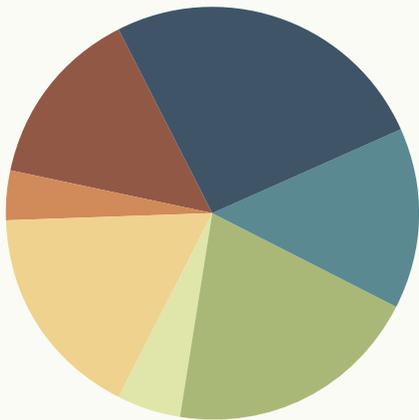
While weather seemed to play a primary role in the prevalence of barn fires, this was not the case in terms of the total number of deaths reported by state. What distinguished states with the highest total fatalities is that, in most, one or two catastrophic fires took the lives of hundreds of thousands of animals at once and accounted for nearly the entire death toll. Even in Michigan—a state that ranked high in both number of barn fires and total fatalities—two of the state’s 42 fires accounted for 96 percent of the total deaths.



Causes of Barn Fires •

Out of 539 total barn fires that caused farm animal fatalities, the cause or likely cause was reported in 179 cases, or roughly 33 percent. In many instances, the destruction that occurred was too severe to determine the cause. In others, the cause was still undetermined or under

investigation at the time of press and an update was never provided. In cases where the cause was confirmed or suspected, nearly two-thirds involved electrical heating devices and other electrical malfunctions.



- 26% Electric heating device (heat lamp, space heater) suspected
- 14% Electric heating device (heat lamp, space heater) confirmed
- 20% Other electrical malfunction suspected
- 5% Other electrical malfunction confirmed
- 17% Miscellaneous machinery (skid loader, hay squeeze, tractor, compression pump, etc.)
- 4% Arson
- 14% Other (weather-related/lightning, wildfire, grass fire, vehicle crash, spilled gas, fireworks, etc.)



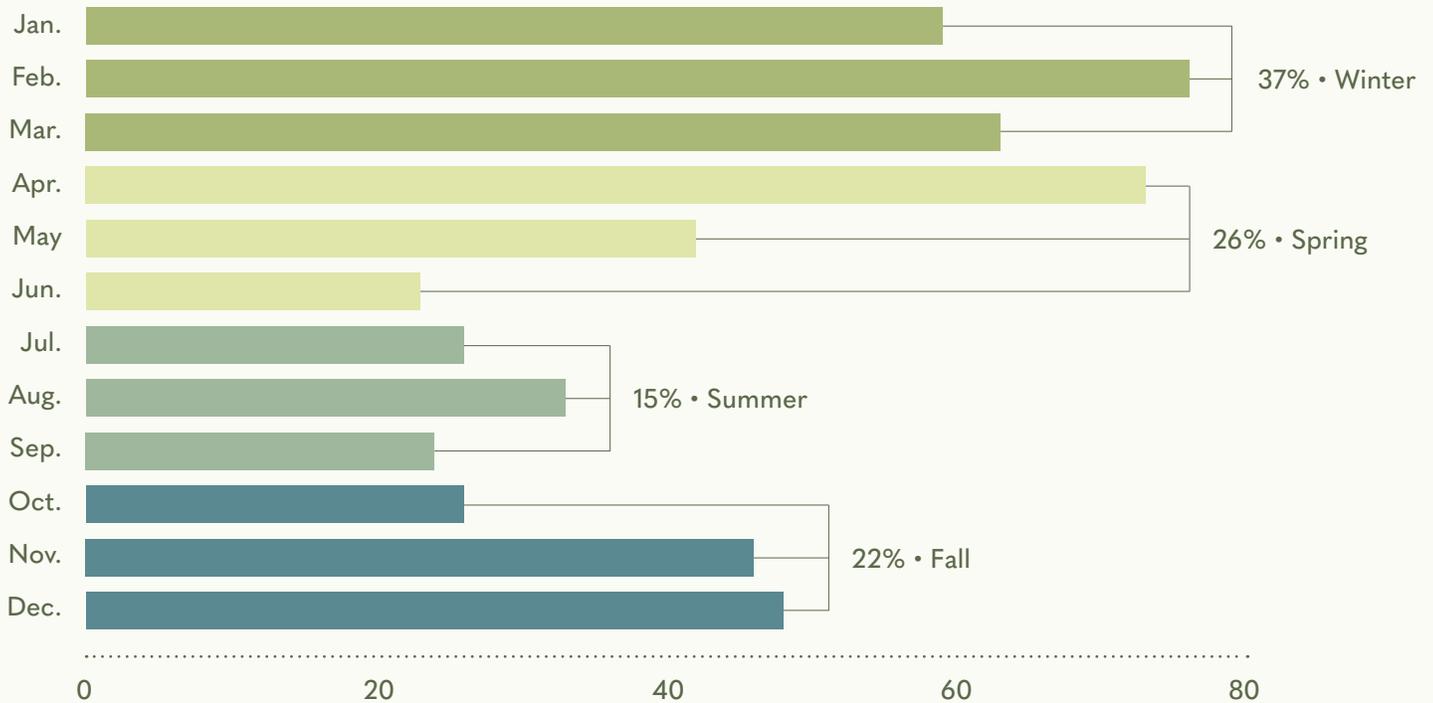
TWYLA FRANCOIS/CEITFA

The aftermath of a massive pig barn fire. Sows were unable to escape from their gestation crates and perished in the fire.

Seasonality of Barn Fires •

Given that heating devices were the most common known cause of barn fires, it is not surprising that more fires occurred during colder months of the year. About 59 percent of fatal

barn fires occurred from October to March, and more than twice as many barn fires occurred in winter (January through March) than in summer (July through September).



Financial Costs of Barn Fires •

Losing animals to barn fires can take an excruciating financial toll on farmers. It is not only the cost of the animals that is so staggering, but also the barn structures themselves and the hay, machinery, and anything else that may have been stored in the barn. Barn fires can cause millions of dollars in damage, particularly on industrial farms, and it can take months to rebuild. Smaller farms tend to fare worse, as they do not have the resources to rebuild as quickly, if at all. Many small farms must rely on help from the community through fundraisers and

donations in the form of funds, equipment, or labor, just to keep their farm afloat.

According to the National Fire Protection Association (NFPA), between 2014 and 2018, barn fires caused an average of \$48 million in property damage annually.¹⁵ This figure is significantly higher than an earlier estimate by the NFPA that pegged the annual cost of damages from barn fires at \$28 million. This—in addition to the rising death toll—demonstrates the problem is only continuing to escalate.¹⁶

Entities Responsible for Monitoring and Reporting Barn Fires •

Several entities are responsible for creating and enforcing fire protection laws and regulations in the United States. While barn fires are monitored at the local, state, and federal levels, as well as by various nonprofit organizations, neither farmers nor fire departments are required to report on farm animal fatalities, so there is currently very little data available.

STATE AND LOCAL AUTHORITIES

For the most part, fire protection and control is the responsibility of state and local governments. Each state has a fire marshal or the equivalent (in Colorado, the position is known as “director of the Division of Fire Prevention and Control”; in Hawaii, it is “chair of the State Fire Council”) who is responsible for performing investigations following a fire, inspecting facilities for compliance with various regulations, and reporting to the National Fire Incident Reporting System (NFIRS). The state fire marshal is also responsible for adopting

fire prevention codes, which can be through transcription (meaning the full code is spelled out in regulation) or by reference (meaning a jurisdiction adopts a short regulation stating that a particular model code—e.g., NFPA 150, Fire and Life Safety in Animal Housing Facilities Code—is legally enforceable as the jurisdiction’s fire safety code).¹⁷ Fire codes are also adopted at the local level, and local fire officials routinely conduct inspections and perform fire investigations.

UNITED STATES FIRE ADMINISTRATION

The United States Fire Administration is part of FEMA. It was created in 1974 under the Federal Fire Prevention and Control Act, and it collects data on fires nationwide through NFIRS. Using this system, local fire departments report incidents to applicable state agencies responsible for collecting the data, who then transfer the reports to NFIRS. According to the US Fire Administration, the data are used to analyze the severity of fires across the nation,



FOTOANDRIUS

make recommendations for national codes and standards, and support federal legislation, among other strategic uses.

Reporting barn fires to NFIRS is not mandatory. While many fire departments choose to do so in order to receive federal grants, some rural fire departments opt out of reporting to NFIRS, potentially due to size, lack of resources, or other reasons. As such, barn fires still go unreported in some cases.

In order to learn more about the nature of past barn fires, AWI submitted a public records request through FOIA for all incident reports submitted to NFIRS that involved barn fires on large operations—meaning those that killed 1,000 or more birds, 250 or more pigs, and 100 or more cows—between 2018 and 2020. AWI requested incident reports for 48 fires; 21 were provided. Unfortunately, little was learned from these reports regarding the cause of the fires, as much of the information provided was extremely vague (i.e., the cause was simply documented as “unintentional”) or, in many cases, the cause was undetermined. Additionally, the reports failed to document any animal fatalities. This is a huge missed opportunity for fire officials to document and track this information to fully understand the scope of the problem, and leaves the tracking of media reports as the only option to continue gathering this information. One significant revelation that did emerge is that a smoke detector was present in just 1 of the 21 large operations for which we received incident reports.

NATIONAL FIRE PROTECTION ASSOCIATION

The NFPA is a nonprofit organization that develops consensus-based codes and standards for fire safety. Once the codes or standards are adopted by state or local governments, they become mandatory. As previously mentioned, the NFPA has developed NFPA 150, Fire and Life Safety in Animal Housing Facilities Code to

address fire protection in animal housing facilities. Chapter 17 of NFPA 150 specifically covers animals used in agriculture that are housed indoors for commercial purposes (animals living on feedlots and pastures and those raised in residential-type settings are excluded).

NFPA 150 has evolved substantially since its initial development in 1979, which was prompted by a series of fires in racehorse stables. It has since been amended 10 times to cover a wider range of species housed in various settings. A specific categorization for agricultural animals was first added to the 2016 edition of NFPA 150 in order to clarify the protections required for these animals under certain general provisions. For the 2019 edition, NFPA 150 was completely rewritten and changed from a standard to a code; under this version, specific provisions were added for animal agriculture facilities that are intended to address the particular hazards and safety needs of such facilities. Under the newest version of the code, the 2022 edition, two notable changes have been made: (1) emergency forces must now be notified of fire alarm signals from agricultural housing facilities, and (2) all facilities must be inspected annually to identify electrical, structural, and housekeeping fire hazards.¹⁸ Both changes were proposed and advocated by AWI as an active member of the NFPA’s technical committee that administers NFPA 150.

Compliance with NFPA 150, especially among some of the nation’s largest producers, has the potential to save thousands of animal lives from a gruesome death. Some of the notable standards incorporated in the code include requirements for fire alarms and detection systems in certain areas of industrial barns (something most such barns currently do not have), emergency management programs that include fire drills and extinguisher training for employees, and a minimum distance between buildings to prevent the spread of a fire to multiple buildings filled with animals.

Existing Fire Protection for Confined Animals •

Compared to other animals living in confinement, farm animals in the United States receive considerably less protection (see appendix). It is worth noting, farm animals are also excluded from the federal Animal Welfare Act, which provides minimal protections for the classes of animals highlighted below, including a recently implemented requirement that facilities develop contingency plans to protect animals during an emergency.

NFPA 150 is an encouraging start and offers reasonable fire protection standards for barns; however, the fact that it is not mandated by statute or regulations nationwide or included within industry and third-party animal welfare certification standards weakens its potential impact.

CAPTIVE WILD ANIMALS

The Association of Zoos and Aquariums (AZA), which accredits over 240 zoos and aquariums nationwide, requires its participating facilities to have detection systems and fire extinguishers, provide training to staff, and conduct live-action fire and other emergency drills annually.¹⁹ Participation in the AZA is not required by law, but many zoos and aquariums in the United States do participate for public relations reasons and to receive a number of benefits.

In the animal agriculture arena, this would be similar to an industry trade association such as the National Chicken Council or the National Pork Producers Council including comprehensive fire protection in their guidelines. An individual farm or facility would not be required to comply, but it would be under great pressure to do so to receive the benefits that go along with being a member of the particular trade association. As currently written, no standards developed by any of the major animal agriculture industry

groups require fire protection measures beyond developing an emergency action plan that may or may not include planning for a fire.

LABORATORY ANIMALS

Many animals confined for use in research are automatically protected from fire because they are housed in laboratories or other areas where humans frequently work. In addition, the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC International) is a voluntary program that research facilities can participate in, similar to the AZA for captive wild animals. Similar to some standards developed by animal agriculture industry groups, AAALAC International's standards don't address fires specifically; rather, they require a disaster plan and humane euthanasia of animals who cannot recover from disaster-related injuries. It also requires that fire officials or police officers must be able to reach those responsible for the animals should a disaster occur at a time when employees are not typically present.²⁰

COMPANION ANIMALS

As is the case with farm animals, there are no federal laws or regulations protecting animals in pet stores and shelters from fires. However, in the aftermath of tragic fires, local and state laws have sometimes been enacted to prevent such fires from reoccurring. In 2015, in response to several pet store fires, the New York City Council passed a bill requiring pet stores to install fire sprinkler systems.²¹ In 2016, California passed a law requiring fire alarm systems and sprinklers in pet boarding facilities.²² And in 2019, in the aftermath of a fire at a kennel that killed 29 dogs, Illinois passed a law requiring kennels to either be staffed at all times or install a sprinkler system or fire alarm that alerts local authorities.²³ There are key similarities between companion animals housed in animal shelters, pet stores, and pet boarding facilities and farm animals housed in



JACK TUMMERS

Cows graze in a pasture while a destroyed chicken barn still smolders after catching on fire.

cages, stalls, and crates within barns—both are trapped in enclosures, unable to escape during an emergency. Yet no legislation has ever been enacted to require fire prevention or suppression systems in barns, even though barn fires occur much more frequently than those in companion animal housing facilities, and they kill hundreds of thousands more animals each year.

INTERNATIONAL PROTECTIONS

While NFPA 150 is the only set of standards designed to protect farm animals from barn fires in the United States, international standards

also exist. Since 2004, the World Organisation for Animal Health (abbreviated as “OIE”—its French initials) has published standards for animal welfare that it updates periodically. Like NFPA 150, these standards are only guidelines for the animal agriculture industry; they are not mandatory. However, in many instances, the US animal agriculture industry closely follows OIE recommendations. The current version of the OIE Terrestrial Animal Health Code recommends that producers have an emergency plan in place to mitigate the impacts of disasters, including fire.²⁴

Recommendations •

No farm animal deserves to die in a barn fire that could have been prevented. Thankfully, there are a number of steps farmers can take—from improving everyday operational protocols to investing in structural and facility renovations—to help prevent barn fires and promote fire safety. To minimize the risk of barn fires, AWI recommends farm owners implement the following fire protection methods:

OPERATIONAL

- **ANNUAL INSPECTIONS**
Annual inspections performed by the fire department can help ensure that all electrical systems on the farm are working properly and that the barns are free of fire hazards. This is also a great opportunity for local fire personnel and other emergency responders to familiarize themselves with the operation, identify potential hazards, locate electrical panels and water sources, and ultimately improve their response should a fire occur.
- **FIRE EXTINGUISHERS**
Fire extinguishers should be strategically placed throughout the facility, including near electrical panels and other potential ignition sources, and are checked at least annually to confirm they are in good working order.
- **EMERGENCY ACTION PLAN**
Proactive planning is the best way to ensure all parties are prepared in the event of an emergency. Planning should include mapping out the operation and identifying fire hazards and potential sources of ignition, documenting contact information for both emergency response units and key farm personnel, and detailing specific procedures to follow should a fire break out. If practicable, the emergency

action plan should include a process for evacuating animals in case of a fire.

- **ANNUAL FIRE SAFETY TRAINING**
It is critical for all farm employees to be familiar with the operation's emergency action plan so they can quickly respond if a fire breaks out, by attempting to extinguish the fire and/or alerting the fire department before it overwhelms the facility. Annual fire safety training, including routine fire drills and fire extinguisher training, will ensure employees are best prepared to respond to a fire.

STRUCTURAL

- **EMERGENCY LANES**
Facilities should have multiple access points that are clear at all times and wide enough for emergency vehicles. It is recommended that emergency lanes be at least 12 feet wide.
- **SPRINKLER SYSTEMS**
Though sometimes cost prohibitive, installation of a sprinkler system is the most effective suppression system for putting out fires and may offer the best chance for reducing fatalities. Depending on the type and location of the facility, there are a number of wet, dry, or pre-action sprinkler systems on the market that provide different benefits. The cost and maintenance of each system varies, so farmers should always consult an expert to determine which type of system is best for their barn(s).
- **BUILDING MATERIALS**
To the extent possible, buildings—particularly, interior walls and ceilings—should be constructed using fire-resistant materials that have low flame spread ratings (materials categorized as “Class A” by the NFPA and other professional entities).

Installation of firestops and firewalls where practicable is also recommended. When constructing multiple animal housing facilities on one site, adequate distance should separate each building to help prevent a fire from spreading to multiple buildings and allow first responders to access different parts of the building. The NFPA recommends a minimum distance of 60 feet between each commercial animal housing facility on a site.

→ **ON-SITE WATER STORAGE**

Many barn fires occur in remote, rural areas where fire hydrants are not always readily accessible. In these cases, water is often trucked in, potentially wasting time in a situation where every minute counts. To assist firefighters with access to water, large operations should install on-site water storage units.

→ **ELECTRICAL SYSTEMS**

Malfunctioning heating devices and other electrical issues caused or were suspected to cause 65 percent of barn fires in which a cause or suspected cause was identified. Heating and other electrical equipment should be frequently check and—if needed—repaired or replaced.

→ **SMOKE, HEAT, OR FLAME DETECTION SYSTEMS**

Early fire detection systems such as smoke, heat, or flame detectors that alert key farm personnel and local first responders may induce a quicker response, mitigate damage, prevent the fire from spreading to additional buildings, and save human and animal lives. At least one of these systems should be professionally installed and regularly tested. Farms should always consult an expert to determine which detection systems are best for their operation.

In addition to these recommendations, there are specific actions that larger, organized entities can take to minimize the occurrence and severity of barn fires. AWI recommends the following for each category:

→ **GOVERNMENT BODIES**

State agencies and municipalities should adopt NFPA 150: Fire and Life Safety in Animal Housing Facilities Code.

Adopting NFPA 150 (specifically Chapter 17: Agriculture) is a great starting point for states and municipalities looking to improve fire safety and decrease fire-related animal deaths. Doing so could prevent numerous animal deaths and protect farm owners and firefighters from serious injuries. While there is room for improvement in NFPA 150, it offers several reasonable provisions for preventing and suppressing fires in barns.

Reporting of farm animal fatalities from fires through NFIRS needs improvement.

Reporting of farm animal deaths from barn fires can be improved in two ways. First, the US Fire Administration should make changes to its NFIRS modules to designate a specific area for fire departments to report farm animal fatalities; this can easily be done using a section already dedicated to reporting civilian and fire service injuries and deaths. Doing so would allow fire departments, regulators, and farmers to develop an understanding of the full scope of the problem. Second, more fire departments should take advantage of the NFIRS program. Given that AWI received less than half of the 48 incident reports requested through FOIA, it can be assumed that many state agencies or local fire departments are failing to submit data to NFIRS.

→ **THIRD-PARTY ANIMAL WELFARE CERTIFICATION PROGRAMS**

Third-party animal welfare certification programs should mandate, as a minimum fire safety standard, compliance with NFPA 150: Fire and Life Safety in Animal Housing Facilities Code. Third-party animal welfare certification programs have publicly available standards participating producers must adhere to, and compliance with the standards is verified by a third-party audit. Considering that certification programs' standards cover a wide range of welfare issues, from housing to transport to physical alterations, adding comprehensive fire safety requirements to the standards could vastly improve animal welfare. While some require emergency response protocols, going a step further and mandating compliance with NFPA 150 would be an appropriate baseline.

→ **ANIMAL AGRICULTURE INDUSTRY**

An industry-wide assessment of the current level of fire prevention and suppression mechanisms in animal housing facilities should be conducted. Though this has long been an issue, little information has

been provided by the industry regarding what companies are currently doing to prevent and suppress fires and how they plan to expand on these efforts to prevent a continued increase in large fires and fatalities. This information is of concern to consumers and could be extremely beneficial for farmers/members, as it would help identify where the biggest gaps are in terms of fire prevention and determine best practices that can be implemented.

Industry guidelines, as a minimum fire safety standard, should include compliance with NFPA 150: Fire and Life Safety in Animal Housing Facilities Code. Like third-party animal welfare certification programs, industry guidelines include standards for animal welfare. Requiring compliance with NFPA as a baseline fire protection standard would be in the best interest of animal agriculture industries because it would not only reduce the pain and suffering experienced by animals killed in barn fires, but also decrease the emotional and financial burdens farmers face as a result of these incidents.

Appendix •

| | |
|---------------------------------|---|
| ENTITY | Association of Zoos and Aquariums |
| TITLE | Accreditation Standards and Related Policies: 2021 edition |
| MANDATORY? | Accreditation program; in order to be accredited, must comply. There are 241 AZA-accredited facilities. |
| NOTABLE LANGUAGE | <p>10.2.2. Systems and methods for fire protection and security must be in place and functional to provide a reasonable level of safety on a 24-hour basis. Routine maintenance records that detail safety checks of the equipment should be kept current.</p> <p>11.2.2. The institution must have appropriate alarms and fire extinguishers readily available and provide training to appropriate paid and unpaid staff.</p> <p>11.2.5. Live-action emergency drills (functional exercises) must be conducted at least once annually for each of the four basic types of emergency (fire is one of them).</p> |
| KINDS OF ANIMALS COVERED | Animals in accredited zoo and aquarium facilities nationwide |

| | |
|---------------------------------|---|
| ENTITY | Federation of Animal Science Societies |
| TITLE | Guide for the Care and Use of Agricultural Animals in Research and Testing, fourth edition |
| MANDATORY? | Serves as a standard for the international accreditation program, AAALAC International. |
| NOTABLE LANGUAGE | <p>Chapter 3: Husbandry, Housing, and Biosecurity. Husbandry. Emergency, Weekend, and Holiday Care. In emergencies, facility security and fire personnel must be able to contact staff members responsible for the care of agricultural animals.</p> <p>A site-specific emergency plan must be developed to care for agricultural animals that are used for research and teaching. The goal for the plan should be to provide proper management and care for the animals regardless of the conditions.</p> <p>Chapter 5: Handling and Transport. Transport. Emergency Procedures for the Research Facility and Transporters. Both research facilities and people transporting animals should have a list of emergency contact phone numbers (this list includes the fire department).</p> |
| KINDS OF ANIMALS COVERED | Cows, horses, poultry, sheep, goats, pigs |

| | |
|---------------------------------|---|
| ENTITY | NFPA 150 |
| TITLE | NFPA 150: Fire and Life Safety in Animal Housing Facilities Code, 2022 edition. |
| MANDATORY? | No; standards that states and municipalities can choose to adopt |
| NOTABLE LANGUAGE | <p>171.4.1 Fire Resistance Rating of Exterior Walls. Where two or more buildings are located on the same lot, the facing exterior walls of Class A buildings to the facing exterior walls of the adjacent buildings shall be separated by a minimum distance of 60 ft. (18.3 m).</p> <p>17.3.4.1 Fire Alarm. A fire alarm system in accordance with Section 9.3 shall be required in Class A facilities.</p> <p>17.3.4.4 Emergency Forces Notification. Emergency forces notification shall be provided in accordance with [Section] 9.5 or the fire alarm signal shall be received at a location approved by the [Authority Having Jurisdiction].</p> <p>17.3.4.5. Detection. An automatic detection system shall be installed in accordance with Section 9.3 in hazardous areas including, but not limited to, the following: Laundry areas Electrical rooms Kitchens Utility rooms Power washing rooms Storage areas greater than 50 ft² or containing flammable and combustible liquids</p> <p>17.3.5.2. Fire Extinguishers. Fire extinguishers shall be provided in accordance with Section 9.10.</p> <p>17.4.1. Disaster/Emergency Management Program. A disaster/emergency management program complying with [Section] 4.3.4 shall be provided.</p> <p>17.4.2 Drills. Animal handlers, designated employees, and supervisory personnel shall hold disaster/emergency drills once annually in accordance with [Section] 4.3.5.</p> <p>17.4.3. Extinguisher Training. All designated employees shall be annually instructed in the use of portable fire extinguishers, emergency egress methods, and other site safety issues. In addition to annual training, new employees shall receive initial training within 30 days of hire.</p> <p>17.8.1 All Category 7 facilities shall be inspected annually to identify electrical, structural, and housekeeping hazards.</p> <p>17.8.2 Inspections shall be performed by qualified personnel.</p> |
| KINDS OF ANIMALS COVERED | Farm animals housed indoors for commercial use; does not apply to agricultural animals housed outdoors or agricultural animals in residential-type housing |

| | |
|---------------------------------|---|
| ENTITY | National Research Council of the National Academies |
| TITLE | Guide for the Care and Use of Laboratory Animals: eighth edition |
| MANDATORY? | Serves as a standard for the international accreditation program AAALAC International. It is also required by the United States Public Health Service Policy. |
| NOTABLE LANGUAGE | <p>Chapter 2. Animal Care and Use Program. Disaster Planning and Emergency Preparedness. Facilities must ... have a disaster plan. The plan should define the actions necessary to prevent animal pain, ventilation, cooling, heating, or provision of potable water. Animals that cannot be relocated or protected from the consequences of the disaster must be humanely euthanized.</p> <p>Chapter 3. Environment, Housing, and Management. Terrestrial Management. Husbandry. Emergency, Weekend, and Holiday Care. In the event of an emergency, institutional security personnel and fire or police officials should be able to reach people responsible for the animals.</p> |
| KINDS OF ANIMALS COVERED | Any vertebrate animal produced for or used in research, testing, or teaching |

| | |
|---------------------------------|--|
| ENTITY | World Organisation for Animal Health |
| TITLE | Terrestrial Animal Health Code - Section 7 |
| MANDATORY? | No; international recommendations |
| NOTABLE LANGUAGE | <p>79.5. Beef Cattle, Recommendations. (3)(h) Where the failure of power, water and feed supply systems could compromise animal welfare, beef producers should have contingency plans to cover the failure of these systems. These plans may include the provision of fail-safe alarms to detect malfunctions, backup generators, access to maintenance providers, ability to store water on farm, access to water cartage services, adequate on-farm storage of feed and alternative feed supply. Plans should be in place to minimise and mitigate the effects of natural disasters or extreme climatic conditions, such as heat stress, drought, blizzard, fire and flooding.</p> <p>710.4. Broiler Chicken, Recommendations. (2)(p) Broiler houses should be constructed and electrical and fuel installations should be fitted to minimise the risk of fire and other hazards.</p> <p>711.7. Dairy Cattle, Recommendations. 16. Disaster management. Plans should be in place to minimise and mitigate the effect of disasters (e.g. earthquake, fire, drought, flooding, blizzard, hurricane). Such plans may include evacuation procedures, identifying high ground, maintaining emergency feed and water stores, destocking and humane killing when necessary.</p> <p>713.26. Pig, Recommendations. Disaster management. Plans should be in place to minimise and mitigate the effect of disasters (e.g. earthquake, fire, flooding, blizzard and hurricane)</p> |
| KINDS OF ANIMALS COVERED | Beef cattle, broiler chickens, dairy cows, pigs |



Mrs. O'Leary's Cow may have gotten a bad rap but the folktale reminds us fire safety is an important part of farm life. People, animals, and property are in danger when fire breaks out on the farm. Inspect your barn and outbuildings for fire hazards to reduce the risk of tragic loss.

- ✓ Heat lamps and space heaters are kept a safe distance from anything that can burn.
- ✓ Heaters are on a sturdy surface and cannot fall over.
- ✓ Electrical equipment is labeled for agricultural or commercial use.
- ✓ All wiring is free from damage.
- ✓ Extension cords are not used in the barn.
- ✓ Lightbulbs have covers to protect them from dust, moisture, and breakage.
- ✓ Damage is identified quickly and repairs are completed with safety in mind.
- ✓ Dust and cobwebs around electrical outlets and lights are removed.
- ✓ Oily rags are stored in a closed, metal container away from heat.
- ✓ Feed, hay, straw, and flammable liquids are stored away from the main barn.
- ✓ The barn is a smoke-free zone.
- ✓ Exits are clearly marked and pathways are clear.
- ✓ Fire drills are held frequently with everyone who uses the barn.
- ✓ Workers are trained to use fire extinguishers.
- ✓ Everyone in the barn knows personal safety is the first priority if a fire breaks out.
- ✓ Hazard checks take place on a set schedule.

Required Equipment

The following safety equipment may be required by local building codes and will help protect your barn. Install and maintain:

- ABC-type fire extinguishers near every exit and within 50 feet from any point in the barn.
- Fire alarm system
- Sprinkler system
- Carbon monoxide detection system



Talk with your local fire department to address safety concerns unique to your farm.

Go to www.nfpa.org/farms to learn more about fire safety on the farm.



**NATIONAL FIRE
PROTECTION ASSOCIATION**
The leading information and knowledge resource
on fire, electrical and related hazards

References •

1. Animal Welfare Institute, Relationship between Environmental Conditions and Animal Welfare in Cage Free Housing for Egg-Laying Hens. Dec. 2020. <https://awionline.org/sites/default/files/uploads/documents/FA-AWI-report-cage-free-environmental-conditions-Dec-2020.pdf>.
2. UPDATE: Thousands of chickens killed after fire breaks out at Michael Foods. Siouxland News. Feb. 27, 2020. <https://siouxlandnews.com/news/local/massive-structure-fire-at-michaels-food-plant-in-bloomfield>.
3. About 300,000 hens were killed in a fire at a Michigan egg farm. CNN Wire. Jan. 4, 2020. <https://kfor.com/news/about-300000-hens-were-killed-in-a-fire-at-a-michigan-egg-farm/>.
4. 280,000 chickens killed in barn fire in California, owner says. Wthr.com. Apr. 24, 2020. <https://www.wthr.com/article/news/nation-world/280000-chickens-killed-barn-fire-california-owner-says/531-5c84624a-62dd-4f8b-bb9c-75ecc0626538>.
5. H Monroe, Nearly 300,000 Chickens Killed Following Massive Fire At Red Bird Egg Farm In Pilesgrove. CBS Philly. July 21, 2020. <https://philadelphia.cbslocal.com/2020/07/21/nearly-300000-chickens-killed-following-massive-fire-at-red-bird-egg-farm-in-pilesgrove/>.
6. R Lotz, UPDATE: Herbruck's Poultry Ranch "fully operational" following fire at facility. WILX First Alert. Apr. 30, 2019. <https://www.wilx.com/content/news/NEWS-ALERT-Fire-at-farm-in-lona-509296521.html>.
7. S O'Reilly, Fire destroys three barns in Dade City, killing at least 250,000 chickens. abc Action News. Dec. 17 2020. <https://www.abcactionnews.com/news/region-pasco/fire-destroys-three-barns-in-dade-city-containing-tens-of-thousands-of-chickens>.
8. M Grey, Minnesota barn fire kills an estimated 12,000 pigs. nbc12. May, 18 2021. <https://www.nbc12.com/2021/05/18/minnesota-barn-fire-kills-an-estimated-pigs/>.
9. J Shike, Barn Fire Kills Nearly 10,000 Pigs on Illinois Farm. Pork Business. January 13, 2021 <https://www.porkbusiness.com/news/industry/barn-fire-kills-nearly-10000-pigs-illinois-farm>.
10. Approximately 10,000 hogs killed in fire at Pillen Family Farms. SandhillsExpress.com. May 12, 2021. <http://sandhillsexpress.com/state-news/approximately-10000-hogs-killed-in-fire-at-pillen-family-farms-ncnidstory43876919/>.
11. 5,000 pigs killed in Ohio barn fire. WTVG. June 20, 2018. <https://www.13abc.com/content/news/5000-pigs-killed-in-Ohio-barn-fire-486012321.html>.
12. K Kuphal, Fire at Heartland Colony destroys barn, kills thousands of pigs. Pipestone County Star. Aug. 12, 2020. https://www.pipestonestar.com/articles/fire_at_heartland_colony/.
13. USDA 2017 Census of Agriculture, p. 442. https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/usv1.pdf.
14. Id, p. 422, 443.
15. M Ahrens, Fires in or at Animal Occupancies (2014-2018). National Fire Protection Association. Apr. 2021. https://www.nfpa.org/assets/files/AboutTheCodes/150/3088_structure_fires_in_animal_occupancies.pdf.
16. B Evarts, Structure Fires in Barns. NFPA Fire Analysis and Research. June 2012. <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Fact-sheets/barnfactsheet.ash>.
17. Introduction to Code Administration and Enforcement. National Fire Academy, U.S. Fire Administration. https://nfa.usfa.fema.gov/ax/pcm/precourse_reading_r0390.pdf.
18. National Fire Protection Association, NFPA 150 Fire and Life Safety in Animal Housing Facilities Code, 2022 edition. <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=150&year=2016>.
19. Association of Zoos & Aquariums, The accreditation standards & related policies, 2021 edition. <https://assets.speakcdn.com/assets/2332/aza-accreditation-standards.pdf>.
20. National Research Council of the National Academies, Guide for the care and use of laboratory animals, eighth edition. 2011. http://www.aalac.org/resources/Guide_2011.pdf. Federation of Animal Science Societies, Guide for the care and use of agricultural animals in research and teaching, fourth edition. 2020. https://www.aalac.org/about/Ag_Guide_3rd_ed.pdf.
21. N.Y.C., N.Y., 28 § 315.2.3 (2015).
22. Cal. Health & Saf Code § 122385 (2016).
23. 225 ILCS 605/18.2 (2019).
24. OIE, Terrestrial Animal Health Code. 2021. <https://www.oie.int/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/>.



Animal Welfare
Institute

www.awionline.org

900 Pennsylvania Avenue, SE, Washington, DC 20003