APHIS FOREIGN ANIMAL DISEASE FRAMEWORK
RESPONSE STRATEGIES

FAD PReP
Foreign Animal Disease Preparedness & Response Plan

United States Department of Agriculture

United States Department of Agriculture • Animal and Plant Health Inspection Service • Veterinary Services

OCTOBER 2015

The Foreign Animal Disease Preparedness and Response Plan (FAD PReP) Manuals provide an introduction to U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) foreign animal disease (FAD) preparedness and response, and the framework for responding to an animal health emergency in the United States.

These manuals are under ongoing review. This document was last updated **October 2015**. Please send questions or comments to

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Executive Summary

There are significant potential consequences of a foreign animal disease (FAD) outbreak in the United States. An FAD outbreak threatens animal health and animal agriculture and may have significant economic consequences. There may be disruptions in the U.S. food supply. In addition to the economic impact, the social and psychological impact on producers, owners, and consumers can be serious.

For example, the 2001 foot-and-mouth disease (FMD) outbreak in the United Kingdom had an estimated impact of between $12–18 billion. An FMD outbreak in the United States could cause economic losses ranging from $15–$100 billion, depending on a number of factors; these include the duration of the outbreak, delay in detection, extent of trade embargoes, choice of response strategies, and consumer reaction to control measures.[1] The overall economic impact would result from lost international trade, as well as costs directly associated with the eradication effort, such as the expenses of depopulation, indemnity, carcass disposal, and cleaning and disinfection. Over $850 million dollars were spent responding to the 2014–2015 highly pathogenic avian influenza (HPAI) outbreak in the United States. In addition, there are direct and indirect costs related to foregone production, unemployment, and losses in related businesses, including tourism.

The U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) has established the Foreign Animal Disease Preparedness and Response Plan (FAD PReP) to provide a framework for FAD preparedness and response. This document provides the response strategies, zone and premises designations, and critical activities for controlling, containing, and eradicating an FAD. This document also has a companion document, the *APHIS Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0), which provides an overview of FAD PReP, Federal roles, APHIS authorities and funding processes, incident management, and communication strategy.

The APHIS goals of an FAD response are to (1) detect, control, and contain the disease in animals as quickly as possible; (2) eradicate the disease using strategies that seek to stabilize animal agriculture, the food supply, and the economy and that protect public health and the environment; and (3) provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected animals and non-contaminated animal products.

Achieving these three goals will allow individual livestock facilities, States, Tribes, regions, and industries to resume normal production as quickly as possible. The objective is to allow the United States to regain disease-free status

[1] See page 1-1 for citations from this section.

without the response effort causing more disruption and damage than the disease outbreak itself.

There are five traditional strategies for the control and eradication of an FAD in domestic livestock that are not mutually exclusive: stamping-out, stamping-out modified with emergency vaccination to kill, stamping-out modified with emergency vaccination to slaughter, stamping-out modified with emergency vaccination to live, and emergency vaccination to live without stamping-out. Any response strategy or strategies implemented will be based on the best available information during the incident.

In order to achieve the goals of an FAD response, critical activities and tools must be implemented to execute the response strategies. Box 1 lists these critical activities and tools. Additionally, to assist in executing response strategies, zones, areas, and premises will be designated.

Box 1. Critical Activities and Tools for an FAD Response

Critical Activities and Tools for Containment, Control, and Eradication

- Public communication and messaging campaign
- Rapid appraisal and indemnity process for producers
- Swift imposition of effective quarantine and movement controls
- Rapid diagnosis and reporting
- Epidemiological investigation and tracing
- Increased surveillance
- Continuity of business measures for non-infected premises and non-contaminated animal products (Secure Food Supply Plans)
- Biosecurity measures
- Mass depopulation and euthanasia (as response strategy indicates)
- Effective and appropriate disposal procedures
- Cleaning and disinfection measures
- Emergency vaccination (as response strategy indicates)

This document, along with other FAD PReP materials, is available to the public at http://www.aphis.usda.gov/fadprep; it is also available to APHIS employees at http://inside.aphis.usda.gov/vs/em/fadprep.shtml. Together, the FAD PReP suite of documents provides a comprehensive preparedness and response framework for an FAD outbreak. Your comments and recommendations on this document are invited by emailing FAD.PReP.Comments@aphis.usda.gov.

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Chapter 1
Introduction

An outbreak of a foreign animal disease (FAD) in the United States—particularly a highly contagious disease—will have many consequences. Animal health and animal agriculture will be threatened; an FAD outbreak may impact the security, cost, and safety of the U.S. food supply. In addition to the economic impact, the social and psychological impact on both producers and consumers may be significant.

The 2001 foot-and-mouth disease (FMD) outbreak in the United Kingdom had an estimated impact of between $12–18 billion.[1] In the United States, the impact of an FMD outbreak would be contingent on many factors, including the duration of the outbreak, delay in detection, extent of trade embargoes, choice of response strategies, and consumer reaction to control measures. Depending on these factors, estimates suggest that economic losses in the United States could range from $15–$100 billion.[2]

The economic impact of an FAD outbreak would result from lost international trade, as well as from costs directly associated with the eradication effort, such as the expenses of depopulation, indemnity, carcass disposal, and cleaning and disinfection. Over $850 million dollars were spent responding to the 2014–2015 highly pathogenic avian influenza (HPAI) outbreak in the United States. In addition, there are indirect costs related to foregone production, unemployment, and losses in related businesses, including tourism.

The United States undertakes many preventive measures to keep FAD agents out of susceptible U.S. animal populations—including import restrictions, exclusion activities at borders, and public education. However, in order to execute a timely, efficient, and appropriate FAD response effort, it remains essential to plan and prepare for an incident. The U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) has established the Foreign Animal

[1] Thompson D, Muriel P, Russell D, Osborne P, et al. 2001. "Economic Costs of the Foot-and-Mouth Disease Outbreak in the United Kingdom in 2001." *Rev Sci Tech Off Int Epiz*. 21: 675-687; Grubman MJ, Bast B. 2004. Foot-and-Mouth Disease. *Cli Microbiol Rev.* 17(2): 465-493; USDA Foreign Agricultural Service. 2007. "UK Foot & Mouth Disease—Recovery Timetable, the Economic Impact and Who Pays?" *Global Agriculture Information Network Report*. Available from http://www.fas.usda.gov/gainfiles/200708/146292150.pdf.

[2] Estimates vary: Carpenter et al. (2011) suggest a loss of $2.3 billion to $69 billion, for an outbreak in California; Ekboir (1999) estimated a loss of between $8.5 billion and $13.5 billion for an outbreak in California. Carpenter TE, O'Brien JM, Hagerman AD, & McCarl BA. 2011. "Epidemic and economic impacts of delayed detection of foot-and-mouth disease: a case study of a simulated outbreak in California." *J Vet Diagn Invest.* 23:26-33; Ekboir JM. 1999. "Potential Impact of Foot-and-Mouth Disease in California: the Role and Contribution of Animal Health Surveillance and Monitoring Services." *Agricultural Issues Center*. University of California, Davis.

Disease Preparedness and Response Plan (FAD PReP) to provide a framework for FAD preparedness and response.

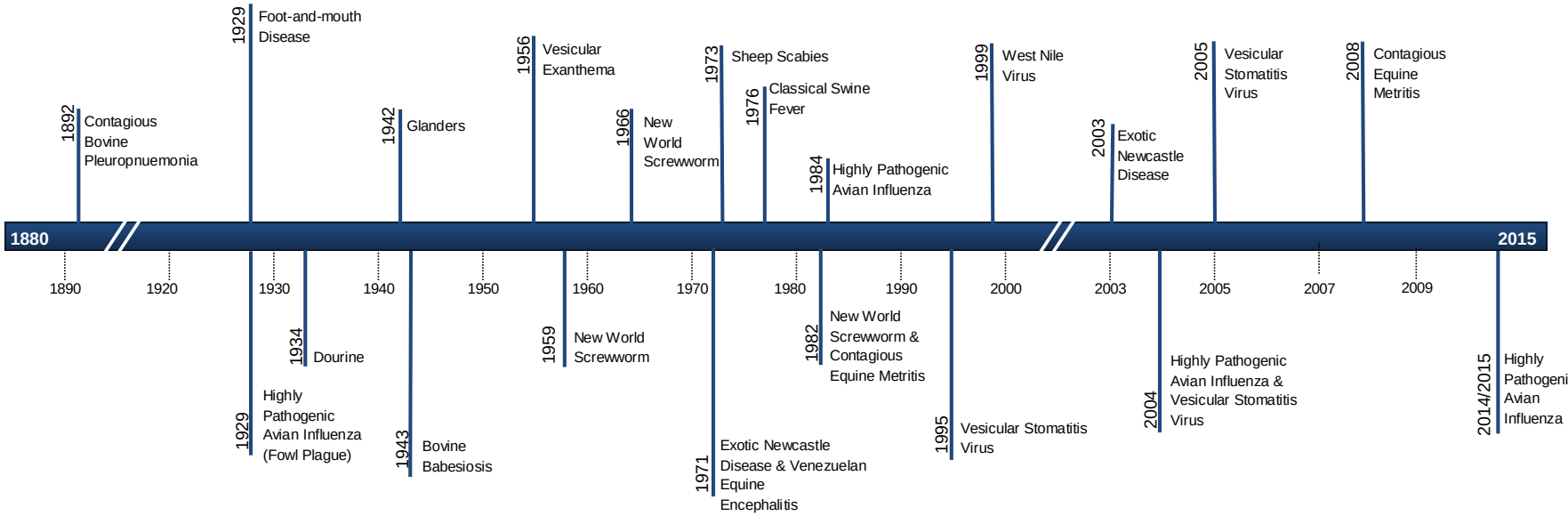
This document—*APHIS Foreign Animal Disease Framework: Response Strategies* (FAD PReP Manual 2-0)—provides significant detail on response strategies for highly contagious FAD outbreaks, including information on zone, area, and premises designations and an overview of other critical activities needed for an effective FAD response. This document has a companion document—*APHIS Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0)—which provides an overview of Federal roles, APHIS authorities and funding processes, incident management, and communications. Together, these and other FAD PReP documents provide a comprehensive preparedness and response framework for an FAD outbreak.

Appendix A contains a list of current FAD PReP documents.

1.1 FADs IN THE UNITED STATES

The United States has been involved in a number of animal disease outbreaks over the past 125 years. Lessons learned from the very first eradication campaign that successfully eliminated contagious bovine pleuropneunomia in 1892 through successive control efforts to the present day, including the 2014–2015 HPAI outbreak, the largest incident in U.S. history, have shaped our current strategies. Please refer to Figure 1-1 for selected FAD events in the United States.

Figure 1-1. Selected FAD Events in the United States 1880–2015



1.2 RESPONSE GOALS

In the event of an FAD outbreak in the United States, State, Federal, and Tribal authorities, as well as agriculture stakeholders, will initiate a series of response activities. The type and magnitude of activities depends on the response goals and regulatory intervention for the FAD outbreak.

The APHIS goals of an FAD response are to (1) detect, control, and contain the disease in animals as quickly as possible; (2) eradicate the disease using strategies that seek to stabilize animal agriculture, the food supply, and the economy and that protect public health and the environment; and (3) provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected animals and non-contaminated animal products.

Achieving these three goals will allow individual livestock facilities, States, Tribes, regions, and industries to resume normal production as quickly as possible. The objective is to allow the United States to regain disease-free status without the response effort causing more disruption and damage than the disease outbreak itself.

1.3 OVERVIEW OF CRITICAL ACTIVITIES FOR AN FAD RESPONSE

In order to achieve the goals of an FAD response, critical activities and tools must be implemented to execute the response strategy. Box 1-1 lists key critical activities and tools.

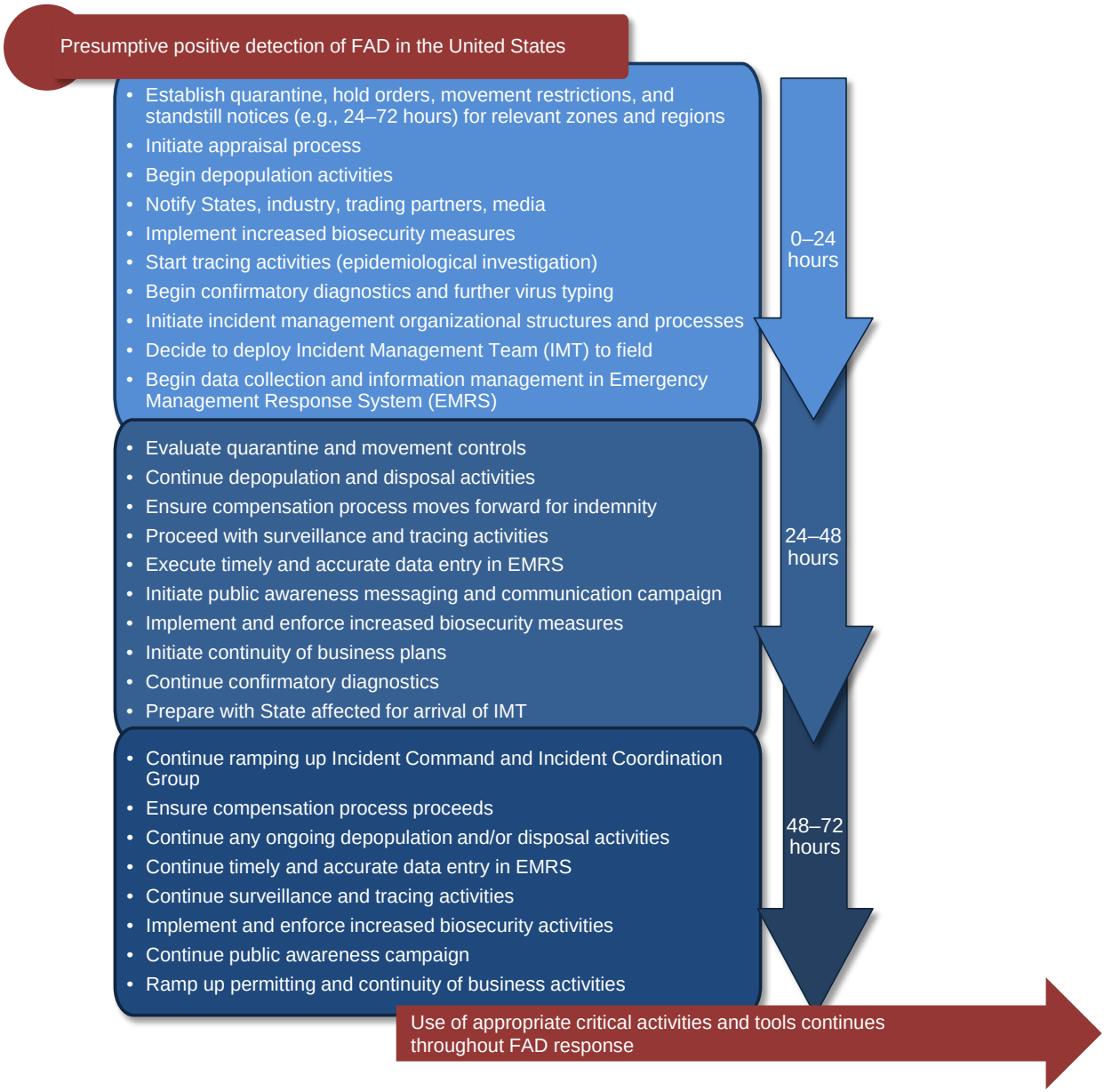
Box 1-1. Critical Activities and Tools for an FAD Response

Critical Activities and Tools for Containment, Control, and Eradication

- Public communication and messaging campaign
- Rapid appraisal and indemnity process for producers
- Swift imposition of effective quarantine and movement controls
- Rapid diagnosis and reporting
- Epidemiological investigation and tracing
- Increased surveillance
- Continuity of business measures for non-infected premises and non-contaminated animal products (Secure Food Supply Plans)
- Biosecurity measures
- Mass depopulation and euthanasia (as response strategy indicates)
- Effective and appropriate disposal procedures
- Cleaning and disinfection measures
- Emergency vaccination (as response strategy indicates)

Figure 1-2 highlights key critical activities that will take place in the first 72 hours of an outbreak. These critical tasks are fundamental to the rapid control and containment of the disease. This figure is not all inclusive—please see Disease Response Plans & Standard Operating Procedures for more information on critical activities.

Figure 1-2. Critical Activities in the First 72 Hours of U.S. FAD Response



Note: IC = Incident Command; ICS = Incident Command System.

Chapter 2
Response Strategies and Principles

2.1 Epidemiological Principles of Response

Three basic epidemiological principles form the foundation of any response strategy to contain, control, and eradicate a foreign animal disease (FAD), in particular highly contagious FADs, in the U.S. domestic livestock and poultry population.

1. *Prevent contact between the disease and susceptible animals*.

    a. This is accomplished through quarantine of infected animals, movement controls in the Infected Zone(s) (IZ) and Buffer Zone(s) (BZ) (Control Area [CA(s)]), and biosecurity procedures to protect non-infected animals.

    b. Certain circumstances may warrant accelerating the depopulation of animals at risk for exposure to the disease to decrease the population density of susceptible animals.

    c. There is a serious but lesser transmission risk posed by people, material, conveyances, and non-susceptible animals that may have been in contact with the disease and serve as mechanical vectors. Contact with susceptible animals should be prevented and transmission risk mitigated through stringent biosecurity and cleaning and disinfection measures.

2. *Stop the production of the FAD agent in infected or exposed animals*. This may be accomplished by slaughter or rapid mass depopulation (and disposal) of infected and potentially infected animals.

3. *Increase the disease resistance of susceptible animals to the disease or reduce the shedding of the FAD agent in infected or exposed animals*. This can be accomplished by emergency vaccination if a suitable vaccine is available and can be administered in a timely manner.

2.2 Regulatory Intervention During an FAD Outbreak

Each State has statutes/regulations governing animal disease reporting. Federally accredited veterinarians are required to report suspected cases of FADs. An FAD

outbreak in the United States may result in emergency regulatory intervention by State, Tribal Nation, and/or Federal authorities. The type and scope of regulatory interventions will depend upon the disease agent, the circumstances of the outbreak, and the consequences of the outbreak. The United States Department of Agriculture (USDA) and the affected States and Tribal Nations will work together in a Unified Command, per the *National Incident Management System* (NIMS), to detect, control, contain, and eradicate the disease as expeditiously as possible. Incident management for a unified State-Federal-Tribal-stakeholder response is discussed in Chapter 4 of the *Animal and Plant Health Inspection Service (APHIS) Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0).

The following are examples of State-Federal-Tribal emergency regulatory interventions for an FAD outbreak:

- *Emergency eradication effort.* Twelve months or less. Regulatory intervention at time of outbreak by State-Federal-Tribal authorities.
- *Extended emergency eradication effort.* Greater than 12 months. Regulatory intervention at time of outbreak by State-Federal-Tribal authorities.
- *National animal disease control program.* Long-term program. Regulatory control program conducted by State-Federal-Tribal authorities.
- *Individual State or Tribal Nation animal disease control program.* Short-term or long-term. State requirements or Tribal Nation requirements.
- *Animal disease monitored with limited or no regulatory intervention.* Short-term or long-term. Little or no regulatory intervention by State-Federal-Tribal authorities.

The scope of regulatory intervention and the selection of a response strategy or strategies in an FAD outbreak will depend on the following:

- *Transmission characteristics of the FAD agent.* The rate of contagious animal disease agent transmission, potential for zoonotic transmission, and the number and types of susceptible animal species. Transmission characteristics of FAD disease agents are discussed in Section 2.3.
- *Consequences of the FAD outbreak.* The consequences of the disease outbreak, and the impact of the response, in terms of disruptions to
  - national security;
  - food security;
  - public health;

- animal health;
- environment;
- economy—short- and long-term impacts for owners, growers, rural economy, and overall economy
  - Local economy and intrastate commerce
  - Interstate commerce
  - International trade; and
- regulatory impacts, including short- and long-term for owners, growers, stakeholders, and general public
  - Local, State, and Tribal regulatory impacts
  - Interstate commerce regulatory impacts
  - International trade regulatory impacts.

- *Acceptance.* Acceptance of response policy (social and political) by different communities:
  - Local, State, and Tribal
  - U.S. regional
  - U.S. national
  - North American
  - International.
- *Scale of outbreak.* The number of animals infected, species infected, number of premises infected, and susceptible animal population density for infected areas or high-risk areas of becoming infected with an FAD.
- *Rate of outbreak spread.* The rate of spread of infection in terms of number of premises, types of premises, number of animals, and types of animals; rate at which each Infected Premises (IP) leads to infection of one or more additional IP.
- *Veterinary countermeasures available.* The availability and efficacy of veterinary countermeasures such as FAD vaccines.

- *Resources available to implement response strategies.* The capabilities and resources available to eradicate an FAD in domestic animals and to control and eradicate an FAD in potential wildlife reservoirs.

- *Domestic animal disease management capabilities.* The capability, feasibility, and resources available to eradicate an FAD in domestic animals as an emergency response operation, or control as an animal disease program, or monitor as an endemic animal disease.

- *Wildlife management capabilities.* The capability, feasibility, and resources available to eradicate, control, or monitor an FAD in wildlife reservoirs.

In the event of an emerging animal disease outbreak, APHIS VS has developed a framework for responding to such incidents. The "Veterinary Services Proposed Framework for Response to Emerging Animal Disease in the United States" is available at https://www.aphis.usda.gov/animal_health/downloads/vs_emerging_diseases_framework.pdf.

2.2.1 Authorization for Response and Associated Activities

When the criteria for a presumptive case have been met, the APHIS Administrator or the Veterinary Services (VS) Deputy Administrator (DA), who is the U.S. Chief Veterinary Officer (CVO), can authorize APHIS personnel—in conjunction with State, Tribal, and Incident Command (IC) personnel—to initiate response activities.

When an FAD is detected, USDA, State, and/or Tribal authorities will immediately quarantine the relevant regions or zones, restrict specific movements, depopulate or euthanize affected animals as determined necessary and as humanely as possible, dispose of carcasses, disinfect property, and increase surveillance in the area to ensure that the FAD has not spread. The Incident Commander works with the Operations Section and Situation Unit in the Planning Section to determine zone, area, and premises designations during an FAD outbreak.

2.2.2 Management of Incident

The outbreak response effort should be implemented through a Unified Command with an appropriate span of control and delegation of authority, employing NIMS. Responses will be as local as possible. Good communication within the chain of command is imperative.

An Incident Commander should be identified and an Incident Command Post (ICP) established. In-State resources (whether State, Federal, Tribal, or privately owned) should be used to manage a local response. Out-of-State resources may be used to support the State impacted by the outbreak.

Incident management will include quarantine and movement control, tracing, and activation of response plans to communicate these actions to all stakeholders, the public, and the international community. Cooperative Federal, State, Tribal, local, and industry response measures will be carried out with extreme urgency using the most appropriate geographic and jurisdictional scopes required to manage the situation. Incident management for unified State-Federal-Tribal-stakeholder response is discussed in Chapter 4 of the *APHIS Foreign Animal Disease Framework: Roles and Coordination* (FAD PReP Manual 1-0).

2.3 Transmission Characteristics of FAD Agents

When evaluating the response strategies to contain, control, and eradicate an FAD affecting livestock, poultry, or other animals, it is necessary to consider the disease agent's transmission characteristics. An animal disease agent is either contagious (transmitted through animal-to-animal contact or fomite-to-animal contact) or not contagious (transmitted through some other means, often an arthropod vector). Contagious diseases may further be categorized as either "highly" contagious or "not highly" contagious. This characterization is based on the epidemiology of the disease and is related to how fast the disease agent can move from animal to animal and farm to farm.

A highly contagious disease is one that spreads rapidly from animal to animal and, if uncontrolled, from herd to herd or flock to flock. Transmission can occur via direct and indirect modes. A highly contagious disease may be recognized by greater than normal morbidity or mortality per unit time (high incidence rate or high attack rate). Sometimes morbidity can be characterized by a loss of production (for example, in milk or eggs) even without overt signs of clinical illness.

Some non-contagious diseases are spread by insect or arthropod vectors. Some of these vectors are found in the United States, while others are foreign to the United States. As such, detecting foreign animal pests is also critical in preventing the introduction and transmission of FADs to the United States.

Any highly contagious FAD agent will require very rapid response actions to control its spread. An animal disease outbreak caused by an agent that is not highly contagious may allow for a less rapid response and still result in elimination of the agent of concern. However, disease agents that are not highly contagious often require a rapid response for reasons other than rapid spread of the agent, including disruptions to interstate commerce, international trade, or their zoonotic potential.

The basic pathway for success in eliminating a highly contagious FAD agent is to control infected and exposed (potentially infected) animals, prevent exposure of susceptible animals, and eliminate an animal's ability to produce the agent.

Unfortunately, depending upon the number of animals infected and their locations, the basic pathway for eliminating an agent can become disruptive to the normal business operations of both infected and non-infected premises.

2.3.1 Terrestrial FAD Threats

Table 2-1 identifies some of the key terrestrial FADs that pose a risk to the United States. This list includes diseases most likely to occur based on known methods of transmission.

Table 2-1. Key Terrestrial FAD Threats to the United States and its Territories

FAD	Primary type of animal affected	Highly contagious disease	Vector-borne disease	Zoonotic disease potential
Diseases with FAD PReP Response Plans (Red Books)				
Highly pathogenic avian influenza (HPAI)	Avian, others	Yes	No	Yes
Foot-and-mouth disease (FMD)	All cloven hoofed animals	Yes	No	No
Classical swine fever (CSF)	Swine	Yes	No	No
Newcastle disease (ND) (virulent ND virus)	Avian	Yes	No	Yes minor
Diseases with FAD PReP Disease Response Strategies				
African swine fever	Swine	Yes	Yes	No
Japanese encephalitis	Equine, swine	No	Yes	Yes
Peste des petits ruminants (PPR)	Caprine, ovine	Yes	No	No
Rift Valley fever	Bovine, ovine, caprine	No	Yes	Yes
Diseases with VS Response Materials				
Contagious equine metritis	Equine	No	No	No
Equine piroplasmosis	Equine	No	Yes	No
Schmallenberg virus	Bovine, caprine, ovine	No	Yes	No
Vesicular stomatitis virus	Equine, bovine, swine, ovine, caprine	No	Yes	Yes rare
Other FAD Threats (Alphabetical Order)				
African horse sickness (AHS)	Equine	No	Yes	No
Akabane	Bovine, ovine, caprine	No	Yes	No
Bovine babesiosis	Bovine	No	Yes	No
Contagious bovine pleuropneumonia (CBPP)	Bovine	Yes	No	No
Contagious caprine pleuropneumonia	Caprine	Yes	No	No
Dourine	Equine	No	No	No
Glanders	Equine	Yes	No	Yes
Heartwater (*Ehrlichia ruminantium*)	Bovine, ovine, caprine, other ruminants	No	Yes	No
Lumpy skin disease	Bovine	No	Yes	No

FAD	Primary type of animal affected	Highly contagious disease	Vector-borne disease	Zoonotic disease potential
Nairobi sheep disease	Ovine, caprine	No	Yes	Yes minor
Nipah, Hendra (Henipavirus)	Swine, equine respectively	Yes (Nipah)	No	Yes
Rabbit hemorrhagic disease	Wild and domestic rabbits (sp. *Oryctolagus cuniculus*)	Yes	No	No
Sheep pox, goat pox	Ovine, caprine	Yes	No	No
Surra (*Trypanosoma evansi*)	Equine, bovine, others	No	Yes	No
Swine vesicular disease	Swine	Yes	No	No
Theileriosis (East Coast fever)	Bovine	No	Yes	No
Venezuelan equine encephalitis	Equine, avian	No	Yes	Yes

2.3.2 Foreign Animal Pest Threats

Table 2-2 identifies some of the key, known foreign animal pests that may pose a risk to the United States. This list includes foreign animal pests most likely to occur based on known methods of transmission.

Table 2-2. Key Foreign Animal Pest Threats to the United States and its Territories

Foreign pest common name	Foreign pest scientific name	Primary type of animal affected	Disease transmitted; condition caused	Zoonotic disease potential
Foreign Animal Pest Threats with FAD PReP Disease Response Strategies				
Screwworm—New World	*Cochliomyia hominivorax*	Warm-blooded animals	Myiasis	Myiasis
VS Control Program Exists				
Cattle fever tick	*Rhipicephalus annulatus (formerly Boophilus annulatus)*	Bovine, ovine, caprine, other species	Bovine babesiosis	No
Southern cattle tick	*Rhipicephalus microplus (formerly Boophilus microplus)*	Bovine, ovine, caprine, other species	Bovine babesiosis	No
Other Foreign Animal Pest Threats (Alphabetical Order by Pest Scientific Name)				
Bont tick	*Amblyomma hebraeum*	Bovine, reptiles, other species	Heartwater	African tick-bite fever Tick typhus
Tropical bont tick	*Amblyomma variegatum*	Bovine, reptiles, other species	Heartwater Bovine dermatophilosis Nairobi sheep disease	African tick-bite fever Tick typhus Crimean-Congo hemorrhagic fever (CCHF) Yellow fever
Screwworm—Old World	*Chrysomya bezziana*	Warm-blooded animals	Myiasis	Myiasis
Louse fly	*Hippobosca longipennis*	Canine, livestock, other species	Bite only	Bite only

Foreign pest common name	Foreign pest scientific name	Primary type of animal affected	Disease transmitted; condition caused	Zoonotic disease potential
European castor bean tick	*Ixodes ricinus*	Bovine, ovine, caprine, other species	Bovine babesiosis	CCHF Lyme disease Bovine babesiosis (splenectomized population)
Licking fly	*Musca vitripennis*	Bovine	Bovine filariosis	No
Sheep scab, sheep mange	*Psoroptes ovis*	Bovine, ovine, other species	Mange	No
Brown ear tick	*Rhipicephalus appendiculatus*	Bovine, ovine, caprine, other species	East Coast fever Nairobi sheep disease	Tick typhus

Note: Myiasis = fly larvae feeding on the host living tissue; mange = hair loss, itching, and inflammation from mite infestation; African tick-bite fever = *Rickettsia africae* (human disease); tick typhus = *Rickettsia conorii* (human disease).

An emerging animal disease may also become a threat to animal health or public health. An emerging animal disease incident may include any terrestrial animal, aquatic animal, or zoonotic disease not yet known or characterized, or any known or characterized terrestrial or aquatic animal disease in the United States or its territories, that changes or mutates in pathogenicity, communicability, or zoonotic potential to become a threat to animals or humans.

An FAD or emerging animal disease incident may involve livestock, poultry, other animals, or wildlife. In the event of an incident involving wildlife, APHIS will work in close collaboration, communication, and coordination with State, Tribal, and Federal wildlife agencies that have primary jurisdictional authority and subject matter expertise for wildlife.

2.4 FAD INVESTIGATIONS

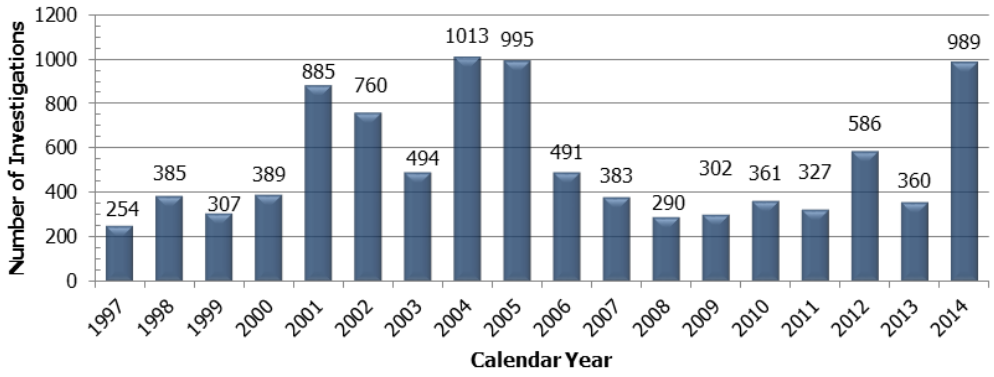
Identification of an FAD begins with the suspected index case investigation and National Veterinary Services Laboratories (NVSL) diagnostic testing. VS Guidance Document 12001, defines APHIS policies and procedures for FAD investigations, including response and communication procedures during the investigation period. The FAD/emerging disease incident investigation period is defined as the time from when the investigation is initiated until the time an FAD/emerging disease incident is ruled out or confirmed. The objectives of an FAD/emerging disease incident investigation are to provide a veterinary medical assessment, provide presumptive and definitive diagnostic testing results, and ensure that the appropriate veterinary medical countermeasures, regulatory actions, and communications are recommended and implemented during the investigation period.

Once an FAD agent is detected, then incident management will be tailored to the specific disease agent and circumstances of the outbreak.

A goal for FAD investigations is to provide presumptive and confirmative diagnostic testing results, as rapidly as possible, given the classification of investigation and designation of diagnostic sample priority. This may include rapid or extraordinary methods for diagnostic sample collection, transport, and testing for those investigations classified as "high suspicion" for an FAD. Rapid diagnostic results facilitate the implementation of appropriate regulatory actions, the application of relevant medical countermeasures, and effective communications, all of which can prevent and/or mitigate the dissemination of the FAD agent by interstate commerce or international trade.

In the past 18 years, there have been over 9,500 investigations conducted on possible FAD or emerging disease incidents throughout the United States, ranging from a yearly low of 254 investigations in calendar year 1997 to a high of 1,013 investigations in 2004 (Figure 2-1).

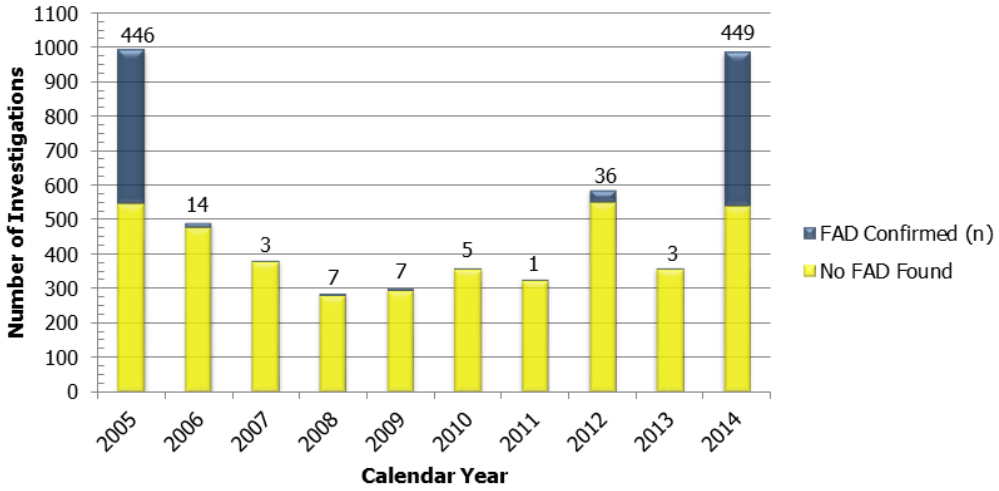
Figure 2-1. FAD Investigations from 1997 to 2014



This summary of FAD investigations was compiled from annual reports on animal health in the United States published by APHIS VS (available here), data from the World Organization for Animal Health (OIE) World Animal Health Information Database (http://web.oie.int/wahis/public.php?page=home), and data in the Emergency Management Response System (EMRS, available here).

From 2005 through 2014, 5,095 possible FAD or emerging disease incidents were investigated by VS and State collaborators. However, only a small percentage of those were confirmed to be actual emerging or foreign animal diseases. The exceptions during this period were the occurrence of wide spread vesicular stomatitis outbreaks that contributed to the 446 confirmed FAD findings in 2005 and the 449 confirmed FAD findings in 2014 (Figure 2-2). The increase in FAD findings during 2012 was also due to an outbreak of vesicular stomatitis.

Figure 2-2. FAD Investigations by Result, 2005 to 2014



2.5 EXAMPLE RESPONSE STRATEGIES

The response strategy or strategies used for the control and eradication of an FAD in domestic livestock or poultry depends on the disease agent, zoonotic potential, ability to control the agent, economic impact, and availability of emergency vaccines. There are five strategies for the control and eradication of a highly contagious FAD in domestic livestock or poultry following an outbreak; these strategies are not mutually exclusive. They are as follows:

- Stamping-out;
- Stamping-out modified with emergency vaccination to kill;
- Stamping-out modified with emergency vaccination to slaughter;
- Stamping-out modified with emergency vaccination to live;
- Emergency vaccination to live without stamping-out.

This section defines and describes each of these strategies in turn. Depending upon the circumstances and scale of the outbreak, a combination of one or more of these strategies can be applied. In some situations, where stamping-out is not feasible and vaccine is not available, the decision may be made to manage the disease to the extent possible through biosecurity and other control measures (e.g., quarantine and movement control). This could result in the United States being endemic for a given disease agent for some period of time.

Analogous strategies for FMD are recognized in the OIE *Terrestrial Animal Health Code (2015)*, Article 8.8.42.

2.5.1 Stamping-Out

2.5.1.1 Defining Stamping-Out as a Response Strategy

Box 2-1 defines stamping-out.

Box 2-1. Stamping-Out

Stamping-Out

Depopulation of clinically affected and in-contact susceptible animals.

2.5.1.2 Describing Stamping-Out as a Response Strategy

Stamping-out has been a common approach in a number of past FAD outbreaks. This strategy is most appropriate if the outbreak is contained to a jurisdictional area or a region in which the FAD can be readily contained and further dissemination of the agent is unlikely. Stamping-out is currently defined in the OIE *Terrestrial Animal Health Code (2015)*.

> Stamping-out means a policy designed to eliminate an outbreak by carrying out under the authority of the Veterinary Authority the following:
>
> a. the killing of the animals which are affected and those suspected of being affected in the herd and, where appropriate, those in other herds which have been exposed to infection by direct animal to animal contact, or by indirect contact with the causal pathogen; this includes all susceptible animals, vaccinated or unvaccinated, on infected establishments; animals should be killed in accordance with Chapter 7.6;
>
> b. the destruction of their carcasses by rendering, burning or burial, or by other method described in Chapter 4.12;
>
> c. the cleansing and disinfection of establishments through procedures defined in Chapter 4.13.

Box 2-2 lists the critical elements of stamping-out. The OIE recognizes that if outbreaks cannot be confined to a Containment Zone (equivalent to a CA), response strategies other than just stamping-out may be necessary.

Box 2-2. Critical Elements of Stamping-Out

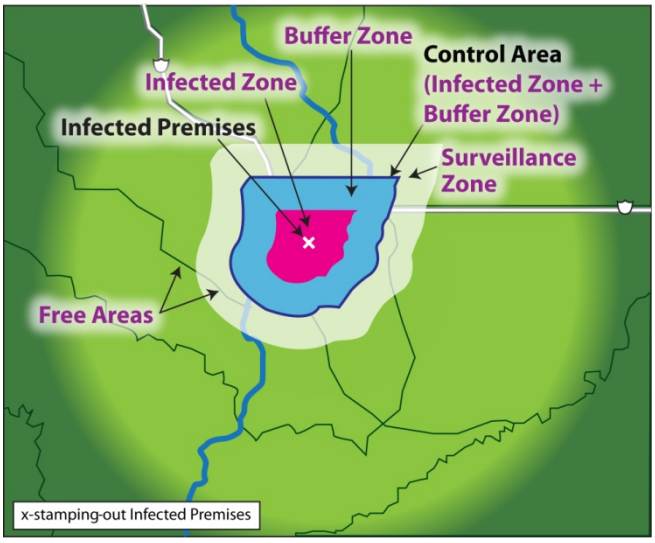
Stamping-Out: Critical Elements

- The goal is that, within 24 hours of (or as soon as possible after) a presumptive positive classification, infected animals are depopulated in the quickest, safest, and most humane way as possible. In many cases, susceptible livestock or poultry on Contact Premises (CP) may also be depopulated as soon as possible.
- Where resources are limited, premises will be prioritized so that those with the highest potential for active FAD spread are "stamped-out" first.
- Based on an epidemiology of the outbreak, prioritizing the animals to depopulate first may be necessary.
- Public concerns about stamping-out will require a well-planned and proactive public relations and liaison campaign. Stakeholders, the public, and the international community must be involved.
- Care should be taken to consider mental health implications for owners and responders in the event a stamping-out strategy is implemented.

2.5.1.3 Zones and Areas in Relation to Stamping-Out

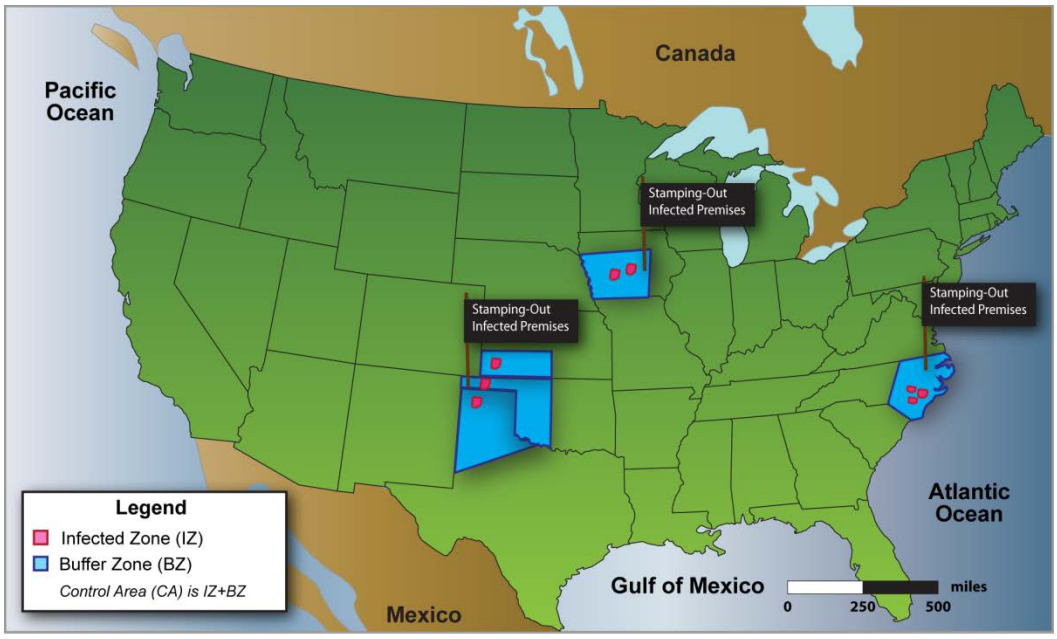
Figures 2-3a and 2-3b show an example of a stamping-out response strategy where IP are depopulated.

Figure 2-3a. Example of Zones and Areas in Relation to Stamping-Out (Infected Premises Would Be Depopulated)



Note: Figure is not to scale.

Figure 2-3b. Example of Zones and Areas in Relation to Stamping-Out (Infected Premises Would Be Depopulated)



2.5.2 Stamping-Out Modified with Emergency Vaccination to Kill

2.5.2.1 Defining Stamping-Out Modified with Emergency Vaccination to Kill as a Response Strategy

Box 2-3 defines stamping-out modified with emergency vaccination to kill.

Box 2-3. Stamping-Out Modified with Emergency Vaccination to Kill

Stamping-Out Modified with Emergency Vaccination to Kill

Depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, with subsequent depopulation and disposal of vaccinated animals. Depopulation and disposal of vaccinates can be delayed until logistically feasible.

2.5.2.2 Describing Stamping-Out Modified with Emergency Vaccination to Kill as a Response Strategy

This strategy involves the depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, *with* subsequent

depopulation and disposal of vaccinated animals. This strategy involves the following:

- A suppressive emergency vaccination strategy;
- The goal is to suppress agent replication in high-risk susceptible animals by using emerging vaccination and then depopulating vaccinates at a later date as determined by IC and the VS Deputy Administrator, the U.S. CVO;
- The targeted vaccination of high-risk susceptible animals in an IZ, BZ, or Vaccination Zone (VZ). Ring or regional vaccination around an IP or IZ is a frequently cited example of this strategy;
- May require vaccinated animal traceability and the diagnostic capability to differentiate between infected and vaccinated animals (DIVA) for movement between zones, interstate commerce, and international trade. These requirements will depend on the length of time between vaccination and depopulation and disposal, as well as other logistical and epidemiological factors; and
- Vaccinated animal identification, movement controls, traceability, and an effective, scalable permitting system may be necessary.

2.5.2.3 Zones and Areas in Relation to Stamping-Out Modified with Emergency Vaccination to Slaughter

Please see Figure 2-4a and 2-4b for examples of the zones and areas in relation to stamping-out modified with emergency vaccination to kill *and* stamping-out modified with emergency vaccination to slaughter (Section 2.5.3.3). The zones and areas are likely to be analogous in these two response strategies; the difference is in the disposition of the vaccinated animals.

2.5.3 Stamping-Out Modified with Emergency Vaccination to Slaughter

2.5.3.1 Defining Stamping-Out Modified with Emergency Vaccination to Slaughter as a Response Strategy

Box 2-4 defines stamping-out modified with emergency vaccination to slaughter.

Box 2-4. Stamping-Out Modified with Emergency Vaccination to Slaughter

Stamping-Out Modified with Emergency Vaccination to Slaughter

Depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, with subsequent slaughter and processing of vaccinated animals, if animals are eligible for slaughter under USDA Food Safety and Inspection Service (FSIS) authority and rules and/or State and Tribal authority and rules.

2.5.3.2 Describing Stamping-Out Modified with Emergency Vaccination to Slaughter as a Response Strategy

This strategy involves the depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, *with* subsequent slaughter and processing of vaccinated animals, if animals are eligible for slaughter under FSIS authority and rules and/or State and Tribal authority and rules. This strategy involves the following:

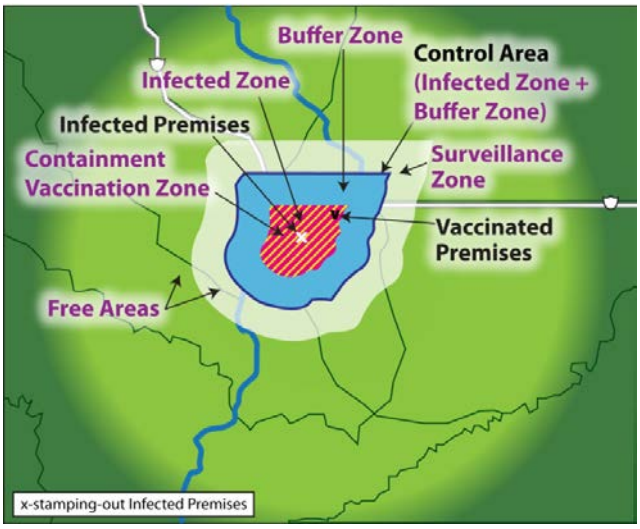
- A suppressive emergency vaccination strategy;
- The goal is to suppress agent replication in high-risk susceptible animals by using emergency vaccination and then slaughtering vaccinates at a later date as determined by IC and the VS Deputy Administrator, the U.S. CVO;
- The targeted vaccination of high-risk susceptible animals in an IZ, BZ, or VZ. Ring or regional vaccination around an IP or IZ is a frequently cited example of this strategy;
- May require vaccinated animal traceability and the diagnostic capability to DIVA for movement between zones, interstate commerce, and international trade; and
- Vaccinated animal identification, movement controls, traceability, and an effective, scalable permitting system may be necessary.

2.5.3.3 Zones and Areas in Relation to Stamping-Out Modified with Emergency Vaccination to Slaughter

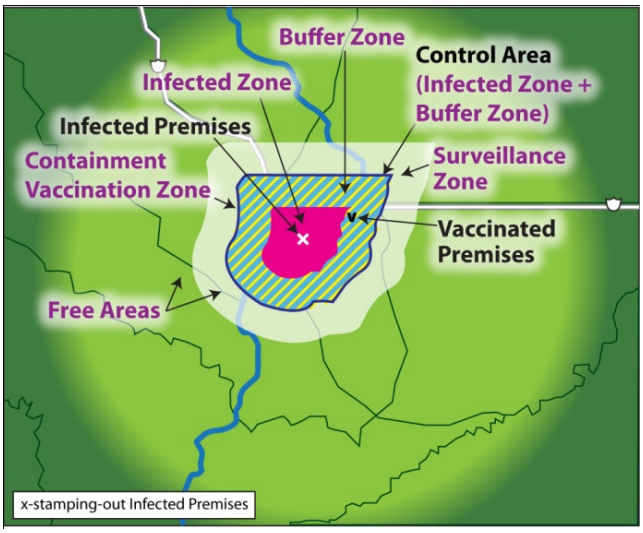
Figures 2-4a and 2-4b show examples of how a stamping-out modified with emergency vaccination to slaughter response strategy might be implemented. Animals on IP would be depopulated, while other animals in a Containment Vaccination Zone (CVZ) may be vaccinated. Stamping-out modified with emergency vaccination to slaughter is the slaughter and processing of vaccinated animals, if animals are eligible for slaughter under USDA FSIS authority and rules and/or State and Tribal authority and rules.

Figure 2-4a. Examples of Zones and Areas in Relation to Stamping-Out Modified with Emergency Vaccination to Kill or Stamping-Out Modified with Emergency Vaccination to Slaughter (Infected Premises Would Be Depopulated)

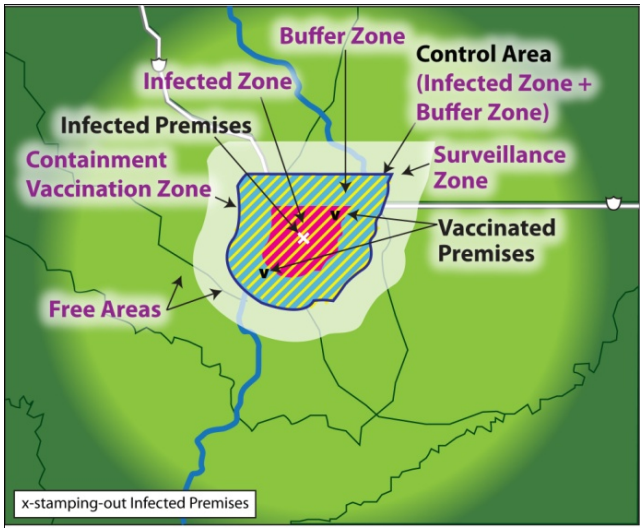
Emergency Vaccination in Infected Zone



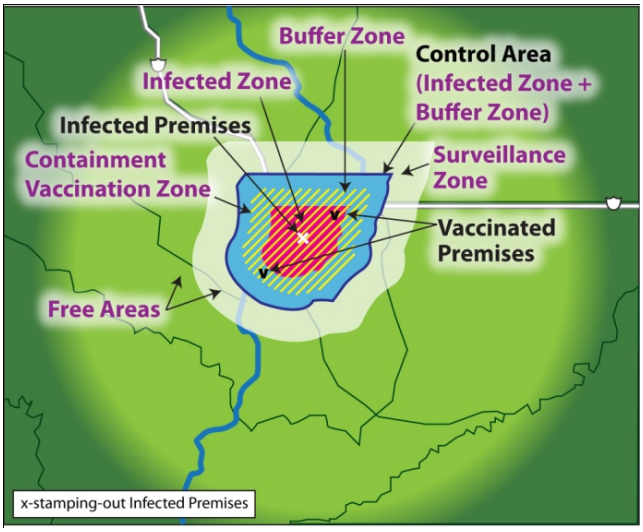
Emergency Vaccination in Buffer Zone



Emergency Vaccination in Control Area

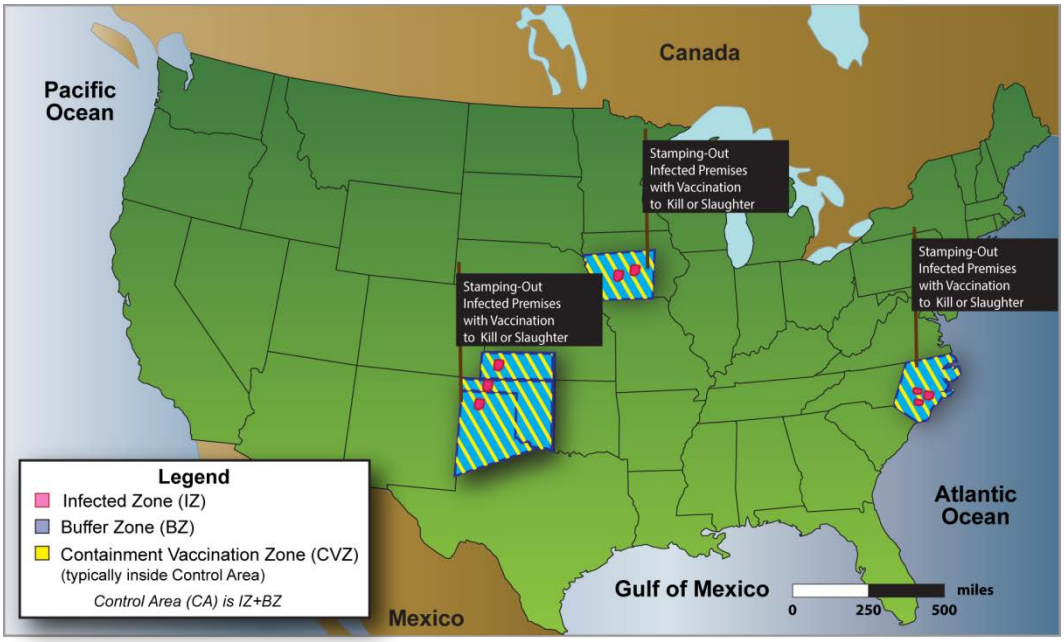


Emergency Vaccination in Infected Zone and Partial Buffer Zone



Note: Figures are not to scale.

Figure 2-4b. Examples of Zones and Areas in Relation to Stamping-Out Modified with Emergency Vaccination to Kill or Stamping-Out Modified with Emergency Vaccination to Slaughter (Infected Premises Would Be Depopulated)



Note: Figure is not to scale.

2.5.4 Stamping-Out Modified with Emergency Vaccination to Live

2.5.4.1 Defining Stamping-Out Modified with Emergency Vaccination to Live as a Response Strategy

Box 2-5 defines stamping-out modified with emergency vaccination to live.

Box 2-5. Stamping-Out Modified with Emergency Vaccination to Live

Stamping-Out Modified with Emergency Vaccination to Live

Depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, without subsequent depopulation or slaughter of vaccinated animals because of their vaccination status. Vaccinated animals intended for breeding, slaughter, milking, or other purposes live out their useful lives.

2.5.4.2 Describing Stamping-Out Modified with Emergency Vaccination to Live as a Response Strategy

This strategy involves the depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, *without* subsequent depopulation or slaughter of vaccinated animals because of their vaccination

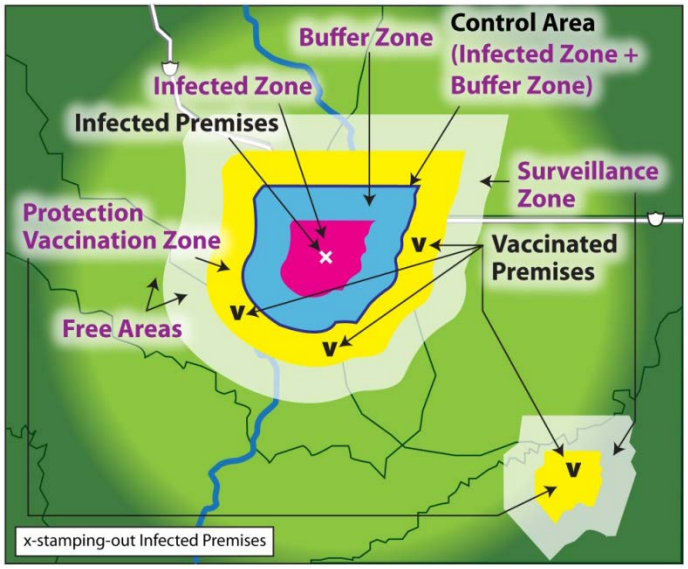
status. Vaccinated animals intended for breeding, slaughter, milking, or other purposes live out their useful lives. If animals are intended for slaughter, animals must be eligible for slaughter under USDA FSIS authority and rules and/or State and Tribal authority and rules. This strategy involves the following:

- A protective emergency vaccination strategy;
- The goal is to protect susceptible animals from infection using emergency vaccination with the deliberate intent to maintain vaccinates for the duration of their usefulness;
- The targeted vaccination of non-infected animals. This may include valuable genetic stock, long-lived production animals, or areas with a high-density population of susceptible animals at high risk of becoming infected;
- Requires the establishment of one or more VZs free of disease, the establishment of one or more CAs for infected animals, and movement controls to keep infected animals out of VZs free of disease;
- DIVA testing may be necessary for movement between zones, interstate commerce, and international trade; and
- Vaccinated animal identification, movement controls, traceability, and an effective, scalable permitting system may be necessary.

2.5.4.3 Zones and Areas in Relation to Stamping-Out Modified with Emergency Vaccination to Live

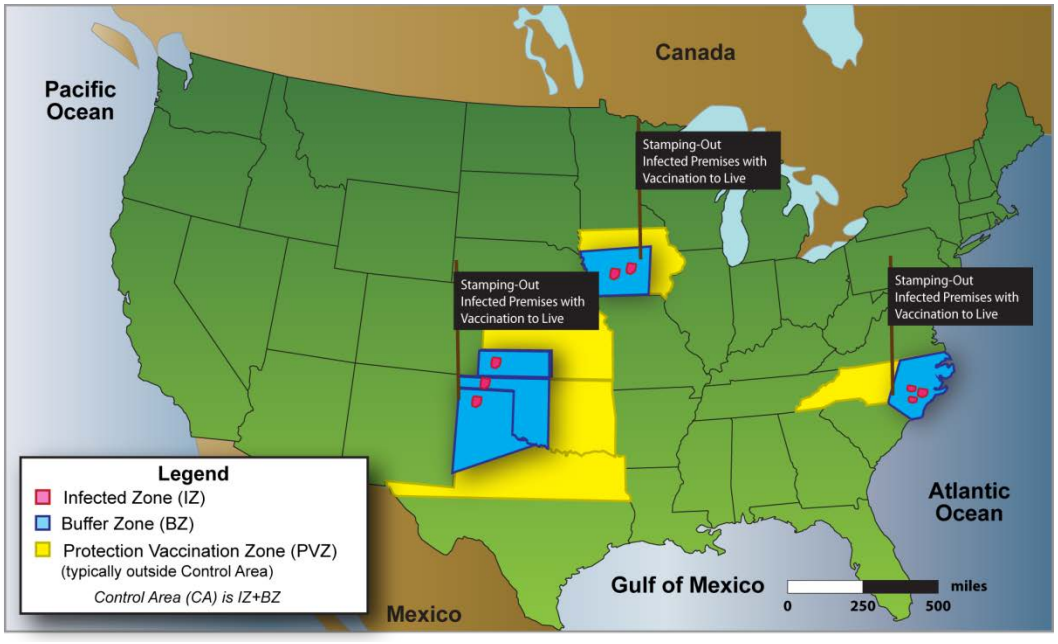
Figure 2-5a and 2-5b show how a stamping-out modified with emergency vaccination to live response strategy might be implemented. Animals on IP would be depopulated, while other animals in a Protection Vaccination Zone (PVZ) would be vaccinated. Any animals vaccinated would not be subsequently depopulated or slaughtered on the basis of vaccination status.

Figure 2-5a. Examples of Zones and Areas in Relation to Stamping-Out Modified with Emergency Vaccination to Live (Infected Premises Would Be Depopulated)



Note: Figure is not to scale. The smaller zone on the lower right hand corner of the above figure illustrates an example PVZ, and associated Surveillance Zone (SZ), which is not surrounding a CA.

Figure 2-5b. Examples of Zones and Areas in Relation to Stamping-Out Modified with Emergency Vaccination to Live (Infected Premises Would Be Depopulated)

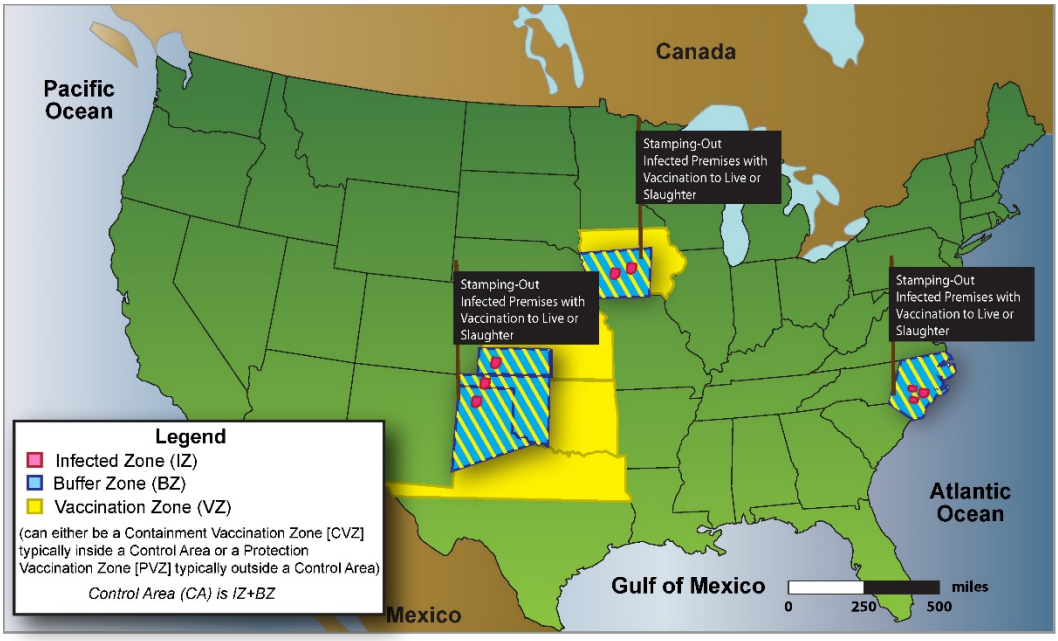


Note: Figure is not to scale.

2.5.4.4 STAMPING-OUT MODIFIED WITH EMERGENCY VACCINATION TO SLAUGHTER AND EMERGENCY VACCINATION TO LIVE

It is possible to implement multiple emergency vaccination response strategies in the event of an FAD outbreak. For example, in Figure 2-6, both emergency vaccination to slaughter and emergency vaccination to live strategies are implemented in different regions, with stamping-out on IP.

Figure 2-6. Examples of Implementing Multiple Emergency Vaccination Strategies with Stamping-Out: Stamping-Out with Vaccination to Slaughter and Vaccination to Live



Note: Figure is not to scale.

2.5.5 Emergency Vaccination to Live without Stamping-Out

2.5.5.1 DEFINING EMERGENCY VACCINATION TO LIVE WITHOUT STAMPING-OUT AS A RESPONSE STRATEGY

Box 2-6 defines emergency vaccination to live without stamping-out.

Box 2-6. Emergency Vaccination to Live without Stamping-Out

Emergency Vaccination to Live without Stamping-Out

Vaccination used without depopulation of infected animals or subsequent depopulation or slaughter of vaccinated animals. This can be described as emergency vaccination to live without stamping-out.

2.5.5.2 DESCRIBING EMERGENCY VACCINATION TO LIVE WITHOUT STAMPING-OUT AS A RESPONSE STRATEGY

This strategy involves targeted emergency vaccination of susceptible animals, with the intention of not depopulating or slaughtering these animals at a later date because of their vaccination status. This strategy is reserved for a disease outbreak in which the disease is widely disseminated across the United States, affecting many animal industries, where resources are not available for stamping-out, and a policy decision has been made not to stamp-out. Although this strategy is highly unlikely to be employed initially in an FAD outbreak response, it is possible that, given the course of an outbreak, the decision might be made to switch to this strategy if the disease becomes widespread.

This strategy involves the following:

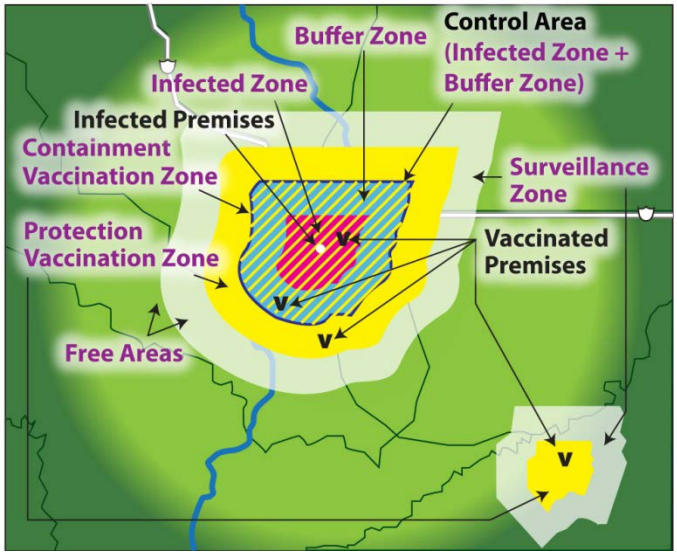
- A protective emergency vaccination strategy;
- The goal is to protect susceptible animals from infection with emergency vaccination, with the intention of not slaughtering vaccinates at a later date because of vaccination status;
- The establishment of one or more VZs free of disease, the establishment of one or more CAs for infected animals, and movement controls to keep infected animals out of VZs free of disease;
- DIVA testing may be necessary for movement between zones, interstate commerce, and international trade; and
- Vaccinated animal identification, movement controls, traceability, and an effective, scalable permitting system may be necessary.

2.5.5.3 ZONES AND AREAS IN RELATION TO EMERGENCY VACCINATION TO LIVE WITHOUT STAMPING-OUT

Figures 2-7a and 2-7b provide examples of emergency vaccination to live without stamping-out. There would be no stamping-out under this response, only emergency vaccination to live. This strategy would not be employed unless the disease is widely disseminated across the United States, resources are not available for stamping-out, and a policy decision has been made to not stamp-out. While it is highly unlikely that this would be the initial strategy employed in an FAD outbreak response, it is possible that, given the course of an outbreak, the decision might be made to switch to this strategy if the disease becomes widespread.

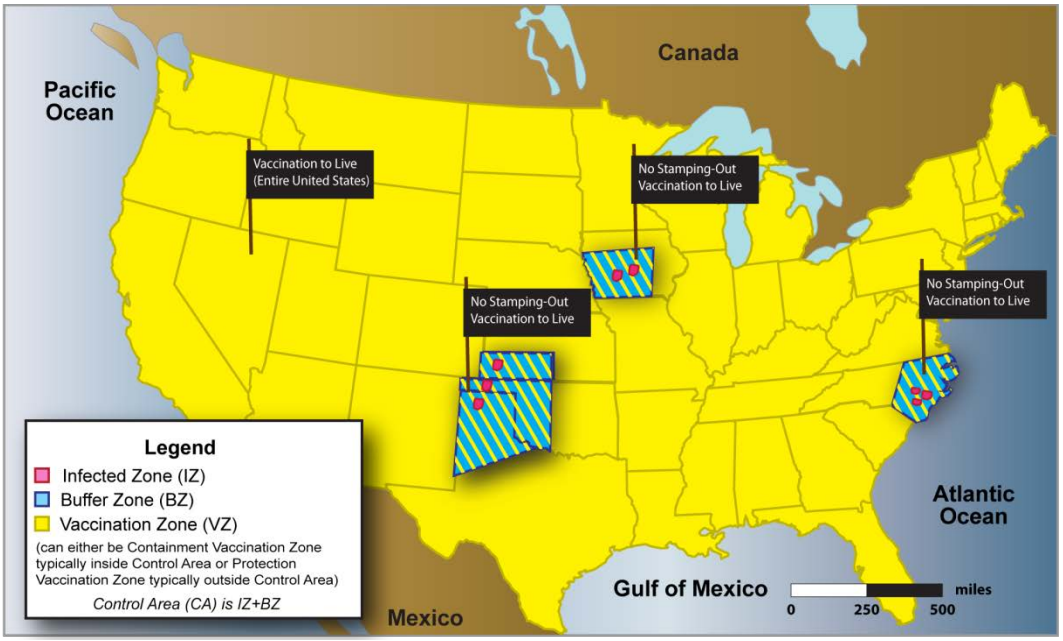
Figure 2-7a. Examples of Zones and Areas in Relation to Emergency Vaccination to Live without Stamping-Out

Containment Vaccination Zone and Protection Vaccination Zone



Note: Figure is not to scale. Yellow signifies a VZ. CVZs are typically inside a CA; PVZs are typically outside a CA. PVZs are intended to be zone(s) without infected animals. The smaller zone on the lower right hand corner of the above figure illustrates an example PVZ, and associated SZ, which is not surrounding a CA.

Figure 2-7b. Examples of Zones and Areas in Relation to Emergency Vaccination to Live without Stamping-Out



Note: Figure is not to scale.

2.5.6 Manage Outbreak Without Widespread Stamping-Out or Vaccination

In some cases, such as when the disease agent is already widespread prior to detection or when it involves a large number of animals, *and* when no effective vaccine is readily available in sufficient quantities, the decision may be made to manage the outbreak without widespread stamping-out or vaccination. The disease would be controlled to the extent possible through rapid and effective implementation of other critical activities, including biosecurity and quarantine and movement control.

This approach to an FAD outbreak may result in the United States being endemic for the disease for a more extended period of time; a longer-term control program for eradication may be developed. While the United States actively works to prepare for FAD outbreaks, there are scenarios in which managing the outbreak without widespread stamping-out or vaccination may be the only option. Effective and rapid FAD tracing, as well as securing appropriate veterinary medical countermeasures, like vaccine, for high-consequence, contagious disease agents is critical to protect animal agriculture and the economy.

2.6 SUMMARY OF SELECTING A RESPONSE STRATEGY

The previous sections have identified and described different response strategies. Choosing one strategy, multiple strategies, or modifying strategies as an outbreak unfolds is a complex decision process. Depending upon the circumstances and scale of the outbreak, a combination of one or more of the response strategies can be applied.

If it becomes apparent at any point in the response that stamping-out will not achieve control, containment, and, ultimately, eradication of the disease, alternative strategies will immediately be considered. Currently, it is not possible to delineate *a priori* the specific factors that might signal the need to modify the response to an FAD outbreak.

No single FAD control or eradication strategy may be perfect or appropriate for all scenarios. Regardless of the FAD agent, the response will use science- and risk-based approaches that protect public health, the environment, and animal health, and stabilize animal agriculture, the food supply, and the economy.

Stamping-out is a viable eradication strategy if an outbreak is detected quickly, while still reasonably localized and contained by quarantine and movement control and biosecurity measures. An essential prerequisite for stamping-out is the existence of good epidemiological investigation functions and FAD tracing

capabilities, which allow the locations and extent of the IP and Control Areas to be rapidly and accurately determined.

Regulatory officials and stakeholders who plan for stamping-out must also have other viable response strategies, in case the spread of the FAD outpaces the resources for stamping-out, or if other factors direct the response away from a stamping-out strategy alone.

In circumstances or scenarios where stamping-out alone will not be a viable eradication strategy, modified stamping-out with vaccination to kill, modified stamping-out with vaccination to slaughter, modified stamping-out with vaccination to live, and vaccination to live without stamping-out are all potential options. Emergency vaccination strategies can be adopted for agents having an effective, safe, available vaccine, and when those strategies are consistent with national and international standards. In order to implement a vaccination strategy, the United States must also have timely access to sufficient quantities of effective vaccine. This can be a significant technical and logistical challenge for many disease agents.

In any situation involving emergency vaccination, movement control, FAD traceability, and a robust information technology system to support permitting, epidemiology, and tracing are essential for the timely continuity of business for non-infected animals, emergency vaccinated animals, and animal products.

Regardless of the response strategy or strategies adopted, early detection and field operations that act with speed and certainty to identify the source of infection and stop the FAD agent from spreading further will decrease the size and duration of the outbreak.

See Table 2-3 for factors that determine whether emergency vaccination strategies are advantageous for responding to an FAD outbreak.

Table 2-3. Factors Determining Viability of Emergency Vaccination

Factor or criterion	Vaccination Decision Points	
	For vaccination	Against vaccination
Suitable vaccine for effective control against FAD agent	Available	Not available
Public health assessment	Supports vaccination	Does not support vaccination
Population density of susceptible animals at high risk of becoming infected	High	Low
Movement of infected animals, products, or fomites out of CA	Evidence of widespread movement	No evidence of widespread movement
Origin of outbreak	Unknown	Known
Spread of outbreak	Rapid	Slow
Distribution of outbreaks	Widespread	Limited or restricted

Factor or criterion	Vaccination Decision Points	
	For vaccination	Against vaccination
Public reaction to total stamping-out strategy (Public reaction may vary by animal species, scale of stamping-out policy, and disease agent)	Strong opposition	Neutral reaction or weak opposition
Domestic stakeholders' acceptance of regionalization with vaccination zones	Yes	No
Third country acceptance of regionalization with vaccination zones	Known	Unknown
Assessments and economic analysis of competing control strategies	It is likely that a control strategy *without* emergency vaccination will lead to significantly higher economic losses or longer duration of the outbreak	It is likely that a control strategy *with* emergency vaccination will lead to significantly higher economic losses or longer duration of the outbreak

Note: This table was adapted from: Council Directive 2003/85/EC of 29 September 2003. *Official Journal of the European Union*. Annex X.

Box 2-7 summarizes FAD response and emergency vaccination strategies.

Box 2-7. FAD Response and Vaccination Strategies

FAD Response and Vaccination Strategies

The use of emergency vaccination strategies may be considered in an FAD outbreak. An emergency vaccination strategy can help to achieve the goals of an FAD response effort, based on the three epidemiological principles of response. There are many challenges to using emergency vaccination in an FAD response, but also many benefits. An FAD response may use one strategy or a variety of strategies in order to detect, control, contain, and ultimately eradicate the disease in domestic animals. The use of emergency vaccination if an appropriate vaccine is available, will be determined by the IC, the State Animal Health Officials (SAHOs), and the VS DA (U.S. CVO).

2.7 OIE-Listed Animal Diseases and International Standards for Response

2.7.1 Recognition of Disease-Free Status

In May 1994, the World Assembly of Delegates of the OIE requested the FMD and Other Epizootics Commission (now called the Scientific Commission for Animal Diseases) to develop a procedure for OIE to officially recognize the FMD-free status of members. In 1998, the official agreement between the World Trade Organization and the OIE further confirmed the OIE's mandate to recognize disease- and pest-free areas and/or risk status (Agreement on the Application of Sanitary and Phytosanitary Measures) for trade purposes. The recognition of official disease status has since been expanded to include official

recognition of a disease status for rinderpest,[1] CBPP, and bovine spongiform encephalopathy (BSE).[2] Since 2012, AHS, CSF, and PPR have also been added to the list of diseases for which official freedom is recognized.

Any Member that wishes to be included in the list of designated disease-status countries or to change its status (for example, to move from the list of FMD free countries or zones where vaccination is practiced to the list of FMD free countries or zones where vaccination is not practiced) sends an application to the OIE Scientific and Technical Department, accompanied by specific documentation and the relevant questionnaires. The Director General then submits the request to the Scientific Commission for evaluation. The OIE Scientific Commission is responsible for assessing these applications for their compliance with the OIE standards.[3]

If there is a disease outbreak, or if the Scientific Commission determines that the country no longer complies with relevant requirements, disease status may be suspended. Suspended status can be reinstated when the country submits a new application that complies with requirements. The Director General of the OIE announces suspension and recovery of official OIE disease status.

For example, the OIE-categories for official country recognition for FMD virus are as follows (*Terrestrial Animal Health Code (2015)* Articles 8.8.2, 8.8.3, 8.8.4, 8.8.5):

- FMD-free country or zone where vaccination is not practiced (Article 8.8.2)
- FMD-free country or zone where vaccination is practiced (Article 8.8.3)
- FMD-free compartment (Article 8.8.4)
- FMD-infected country or zone (Article 8.8.5).

OIE Members can also self-declare their entire country, zone, or compartment free from certain OIE-listed diseases other than AHS, BSE, CBPP, CSF, FMD, rinderpest, and PPR. In this case, delegates are advised to consult the *Terrestrial Animal Health Code* or the *Aquatic Animal Health Code* to verify whether specific requirements for self-declaration of freedom from that particular disease are available. By providing the relevant epidemiological evidence, an OIE

[1] Rinderpest is no longer listed due to its worldwide eradication, officially declared in May 2011 by the OIE.

[2] Please note that the OIE recognizes freedom of all the diseases listed here except for BSE, which it recognizes either “negligible” or “controlled” risk status.

[3] World Organization for Animal Health (OIE), “Standard Operating Procedures for Official Recognition of Disease Status or Risk of Bovine Spongiform Encephalopathy and for the Endorsement of National Official Control Programmes of Member Countries,” 2015, http://www.oie.int/fileadmin/Home/eng/Animal_Health_in_the_World/docs/pdf/SOP2015/EN_SOP2015.pdf.

Member can demonstrate to a potential importing country that the entire country or a zone under discussion meet the provisions of the specific disease chapter. Any submitted self-declaration should contain evidence demonstrating that the requirements for the disease status have been met in accordance with the OIE standards. The self-declaration of freedom from a given OIE-listed disease (other than AHS, BSE, CBPP, CSF, FMD, rinderpest, and PPR) is the responsibility of the Member concerned, and the OIE is not responsible for inaccurate publication of self-declarations of country or zonal disease status based on inadequate information, changes in epidemiological status, or other significant events that were not promptly reported to the headquarters after the self-declaration of freedom for that given disease.

The self-declaration must be signed by the official OIE delegate of the OIE Member concerned. The data provided must conform to the requirements described in the standard measures contained in the *Terrestrial* or *Aquatic Codes*.

Upon request of the OIE delegate, a self-declaration may be published in the OIE *Bulletin* for information of all OIE Members. The self-declaration for publication must contain information demonstrating that the requirements have been met, as described in the OIE standards.[4]

2.8 Executing a Response Strategy

Many critical activities and tools are employed to execute the response strategies during an FAD outbreak. These critical activities are important capabilities for an effective response. This section describes some of those activities; Appendix B contains a list of example preparedness and response goals for selected activities and tools.

- Epidemiological investigation and FAD tracing:
  - Critical in minimizing the size and duration of an FAD outbreak.
  - Includes activities such as the trace-forward and trace-back of infected animals, exposed animals, contaminated animal products, and fomites to determine the source of infection and stop the spread of infection from animals on IP and CP.
- Surveillance:
  - Determines the extent of infection for premises and zones with defined plans for clinical observation and diagnostic testing.

[4] For further information, the OIE provides *Standard Operating Procedures for Official Recognition of Disease Status or Risk Status of Bovine Spongiform Encephalopathy and for the Endorsement of National Official Control Programmes of Member Countries*, http://www.oie.int/fileadmin/Home/eng/Animal_Health_in_the_World/docs/pdf/SOP2015/EN_SOP2015.pdf.

- Also provides information for disease-freedom for premises and zones with defined plans for clinical observation and diagnostic testing.

- Biosecurity:

  - Necessary to (1) contain the agent on IP (biocontainment), and (2) prevent the introduction of the agent via movement of personnel and material to naïve animals and premises (bioexclusion).

  - A careful balance must be maintained between facilitating response activities and ensuring personnel do not expose naïve animals and premises to the disease.

- Information management:

  - EMRS 2.0 is the system of record for all FAD investigations, FAD incidents, and other animal health events as specified.

  - Data must be entered into the EMRS system in a timely manner (ideally less than 24 hours), consistently, and accurately for situation reporting at all levels.

- Quarantine and movement control:

  - Quarantines will be implemented for IP, Suspect Premises (SP), and CP. Movement controls will be implemented for At-Risk Premises (ARP) and Monitored Premises (MP) within a CA.

  - Movement control of susceptible animals and animal products within, into, and out of a CA is accomplished by risk assessments, surveillance requirements, biosecurity procedures, and permitting.

  - Movement controls of susceptible animals may also be implemented on broader geographical areas or by jurisdictions, such as a State, regionally, or nationally, to limit the "silent spread" of infection (for certain disease agents, such as FMD). The time period for this type of movement control needs to be defined, such as for an incubation period for the disease or other specified period.

- Continuity of business:

  - Provides science- and risk-based approaches and systems for the continuity of business involving non-infected animals and non-contaminated animal products.

  - Establishes a transparent and effective system for risk assessments, surveillance requirements, biosecurity procedures, and a permit

process in order to promote stakeholder acceptance and compliance with regulatory interventions by State, Federal, and Tribal authorities.

- Cleaning and disinfection/virus elimination:
  - This activity eliminates a contagious agent from contaminated premises and fomites with proper sanitary procedures including cleaning (e.g., removal of contamination; organic matter) and disinfection (application of physical or chemical measures to eliminate the disease agent).
    - Cleaning and disinfection activities should eliminate the virus in the most cost-effective way possible.
  - Any method selected should consider the characteristics of the premises/houses and other factors which may impact the effectiveness of virus elimination.
- Disposal:
  - This activity disposes of animal carcasses, contaminated and potentially contaminated materials, animal products, and items that cannot be properly cleaned and disinfected in a biosecure manner that does not allow disease spread with minimal negative environmental impact.
- Public awareness campaign:
  - Public awareness campaigns engage and leverage State, Federal, Tribal, and stakeholder relationships to provide unified public messages for local, national, and international audiences.
  - This activity addresses issues and concerns relating to food safety, public health, and animal welfare.
  - This activity addresses issues and concerns related to interstate commerce, continuity of business, and international trade.
- Emergency vaccination:
  - Emergency vaccination may be employed depending upon the availability and efficacy of a vaccine, the goals of the outbreak response, the circumstances of the outbreak, approval of the IC, the SAHOs, and the VS DA (U.S. CVO).
  - DIVA testing may be necessary for movement between zones, interstate commerce, and international trade.

Chapter 3
Designating Zones and Premises

3.1 AREAS AND ZONES

In general, an animal disease outbreak response may involve seven types of zones/areas. These zones and areas are the 1) Infected Zone (IZ); 2) Buffer Zone (BZ); 3) Control Area (CA); 4) Surveillance Zone (SZ); 5) Free Area (FA); 6) Containment Vaccination Zone (CVZ); and 7) Protection Vaccination Zone (PVZ).

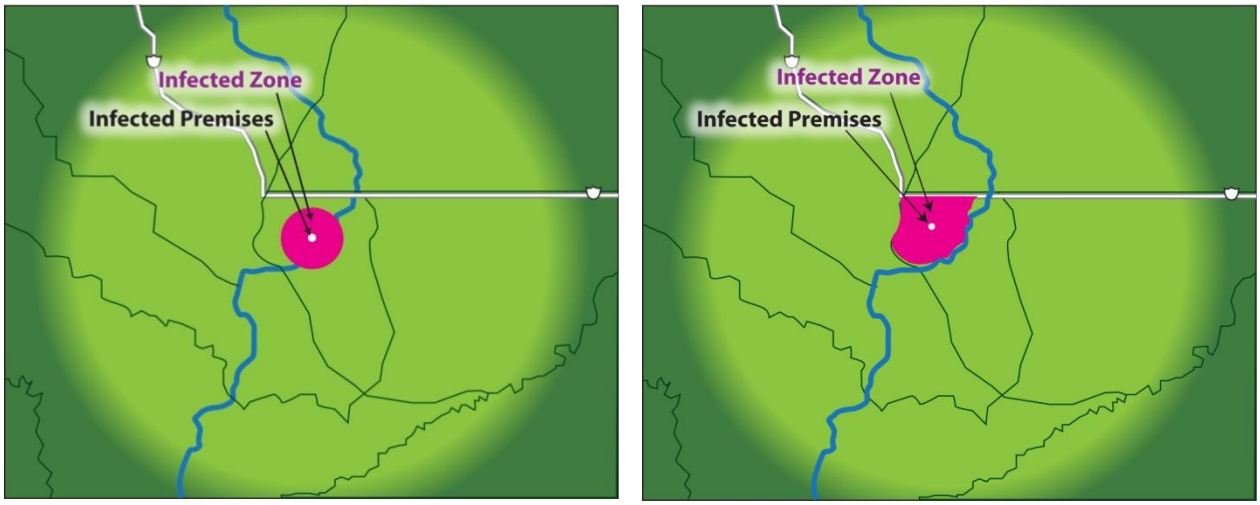
This section provides detail on these areas and zones.

3.1.1 Infected Zone

- An IZ immediately surrounds an Infected Premises (IP) (see Figure 3-1).
- IP, Suspect Premises (SP), and Contact Premises (CP) are subject to individual premises quarantine. At-Risk Premises (ARP) and Monitored Premises (MP) are subject to movement control.
- An IZ will initially encompass all presumptive or confirmed positive premises and include CP as required epidemiologically or logistically.
  - The size of an IZ depends upon the foreign animal disease (FAD) agent and may be modified or redefined as needed by the circumstances of the outbreak.
  - The perimeter of an IZ should be at least 3 km (1.86 miles) beyond the perimeters of presumptive or confirmed IP.
  - An IZ may initially be as large as a county, township, district, or other jurisdictional area.
  - Considerations for establishing the size of an IZ:
    - potential consequences of not containing the disease agent to a particular jurisdictional or geographical area; and
    - potential consequences of movement restrictions (or implementation of a permit process) on a large geographical or jurisdictional area.

- See the tables in Section 3.4 and the disease specific response plans for more guidance on moving animals and animal products into, within, and out of a CA.

Figure 3-1. Infected Zone



Note: Figures are not to scale.

3.1.2 Buffer Zone

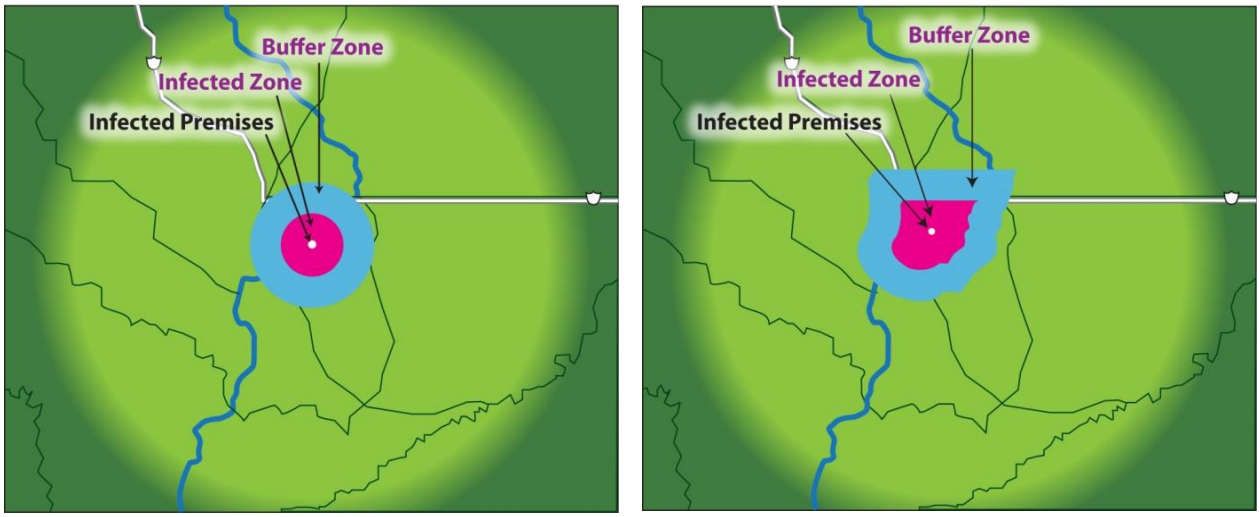
- A BZ immediately surrounds an IZ or a CP (see Figure 3-2). A BZ and IZ together constitute a CA.
- Within a BZ, CP are subject to individual premises quarantine. ARP and MP are subject to movement control.
- A BZ is a scalable area with a width that is never less than the minimum radius of the associated IZ, but may be much larger.
  - The perimeter of a BZ should be at least 7 km (4.35 miles) beyond the perimeter of the IZ.
  - The size of a BZ depends upon the FAD agent and circumstances of the outbreak.
    - The boundaries of a BZ may be modified or redefined as needed by the circumstances of the outbreak.
  - Considerations for establishing the size of a BZ.
    - potential consequences of not containing the disease agent to a particular jurisdictional or geographical area; and

- potential consequences of movement restrictions (or implementation of a permit process) on a large geographical or jurisdictional area.

- See the tables in Section 3.4 and the disease specific response plans for more guidance on moving animals and animal products into, within, and out of a CA.

- If a CP is identified outside a CA, it may be surrounded by a BZ until the disposition of the CP is determined.

Figure 3-2. Buffer Zone



Note: Figures are not to scale.

3.1.3 Control Area

- A CA consists of an IZ and a BZ (see Figure 3-3).

- IP, SP, and CP are subject to individual premises quarantine. ARP and MP are subject to movement control.

- The size of a CA depends upon the FAD agent and circumstances of the outbreak and may be modified or redefined as needed by the circumstances of the outbreak.

  - The perimeter of a CA should be at least 10 km (6.21 miles) beyond the perimeter of the closest IP.

  - Initially a CA may be much larger, such as multiple counties, a State, a Tribal Nation, or multiple States. The size of a CA is scalable to the risk, or the uncertainty of the risk, posed by the disease agent and the circumstances of the outbreak.

- The boundaries of a CA can be modified or redefined when tracing and other epidemiological information becomes available.

- Table 3-1 lists factors that should be considered when determining the size of a CA.

- Considerations for establishing the size of a CA:

  - potential consequences of not containing the disease agent to a particular jurisdictional or geographical area; and

  - potential consequences of movement restrictions (or implementation of a permit process) on a large geographic or jurisdictional area.

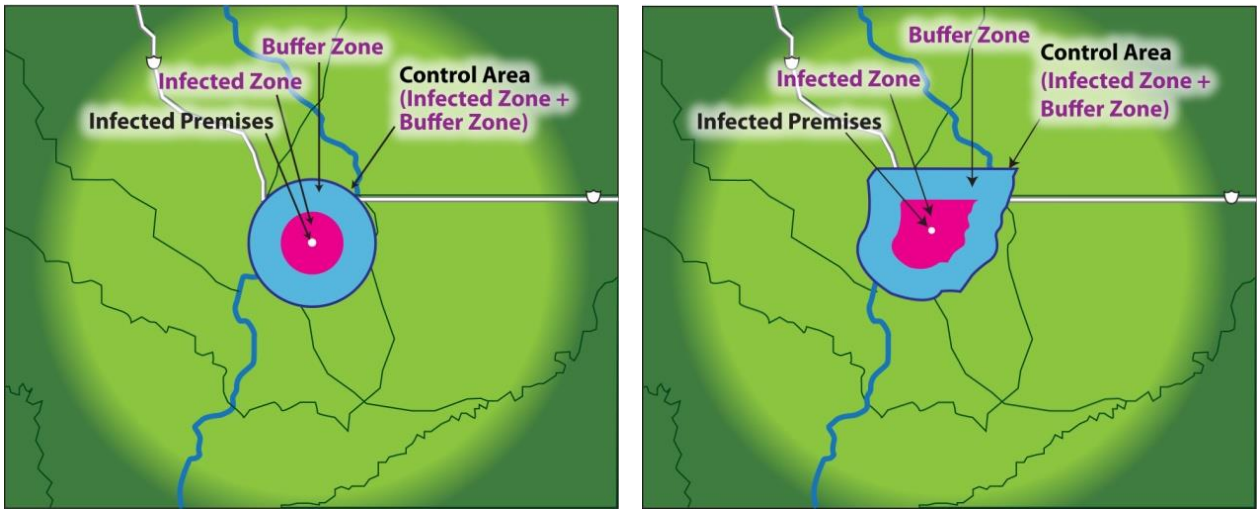
Table 3-1. Factors to Consider in Determining Control Area Size

Factors	Additional details
Jurisdictional areas	◆ Effectiveness and efficiency of administration ◆ Multi-jurisdictional considerations: local, State, Tribal, and multistate
Physical boundaries	◆ Areas defined by geography ◆ Areas defined by distance between premises
FAD epidemiology	◆ Reproductive rate ◆ Incubation period ◆ Ease of transmission ◆ Infectious dose ◆ Species susceptibility ◆ Modes of transmission (such as fecal-oral, droplet, aerosol, vectors) ◆ Survivability in the environment ◆ Ease of diagnosis (for example, no pathognomonic signs; requires diagnostic laboratory testing) ◆ Age of lesions
Infected Premises characteristics	◆ Number of contacts ◆ Transmission pathways and transmission risk ▪ Extent of animal movement ▪ Number of animals ▪ Species of animals ▪ Age of animals ▪ Movement of traffic and personnel to and from premises (fomite spread) ▪ Biosecurity measures in place at time of outbreak
Contact Premises characteristics	◆ Number and types of premises ◆ Susceptible animal populations and population density ◆ Animal movements ◆ Movement of traffic (fomites) and personnel to and from premises (fomite spread) ◆ Biosecurity measures in place prior to outbreak
Environment	◆ Types of premises in area or region ◆ Land use in area or region ◆ Susceptible wildlife and population density ◆ Wildlife as biological or mechanical vectors

Table 3-1. Factors to Consider in Determining Control Area Size

Factors	Additional details
Climate (for aerosol spread diseases)	◆ Prevailing winds ◆ Humidity
General area, region, or agricultural sector biosecurity	◆ Biosecurity practices in place prior to outbreak ◆ Biosecurity practices implemented once outbreak detected
Number of backyard or transitional premises	◆ Types of premises, animal movements, and network of animal and fomite movements
Continuity of business	◆ Continuity of business plans and processes in place or activated at beginning of outbreak (such as surveillance, negative diagnostic tests, premises biosecurity, and risk-assessments) ◆ Permit processes, memorandums of understanding, and information management systems in place or activated at beginning of outbreak

Figure 3-3. Control Area



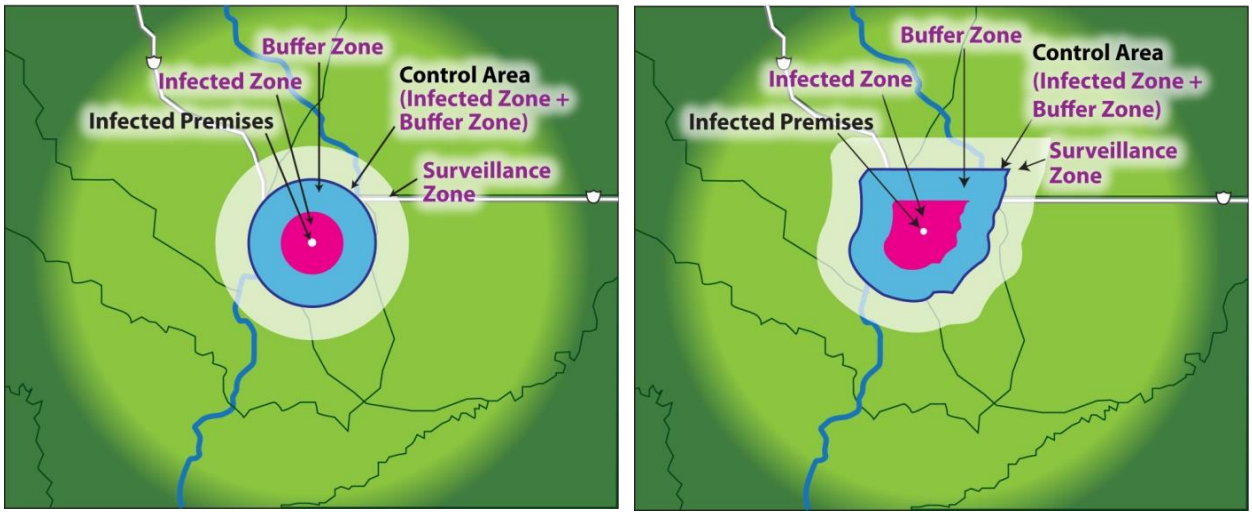
Note: Figures are not to scale.

3.1.4 Surveillance Zone

An SZ should be established in the FA, outside and along the border of a CA, separating the remainder of the FA from a CA (see Figure 3-4).

Surveillance in an SZ will focus on premises determined to be at the highest risk of infection. The width of an SZ should be at least 10 km (6.2 miles). The maximum size of an SZ may be much larger.

Figure 3-4. Surveillance Zone

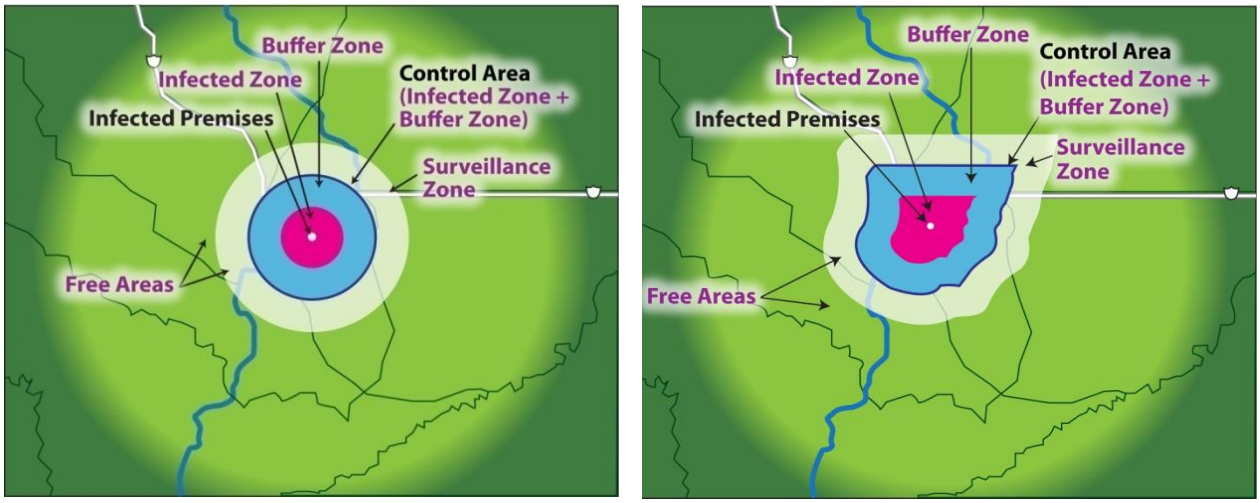


Note: Figures are not to scale.

3.1.5 Free Area

The FA is the area not included in any CA. The FA includes an SZ but can extend beyond it (see Figure 3-5). The FA may also include a PVZ.

Figure 3-5. Free Area



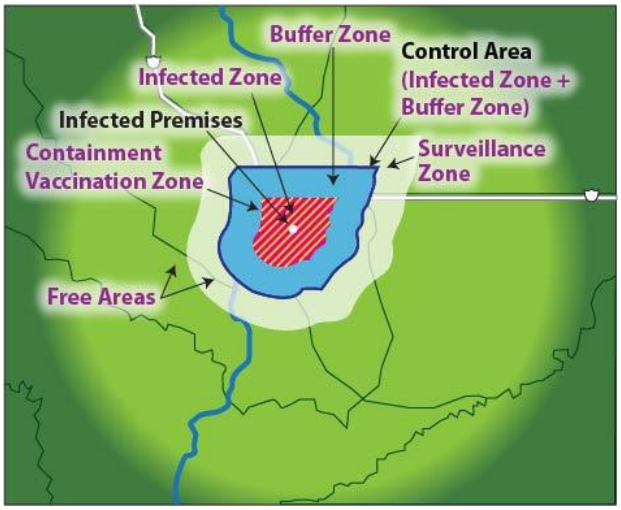
Note: Figures are not to scale.

3.1.6 Containment Vaccination Zone

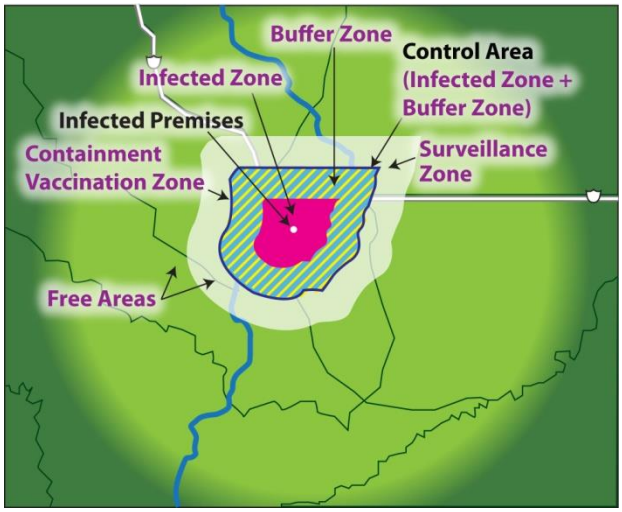
- A CVZ is an emergency vaccination zone, typically inside a CA. It may include all or part of an IZ and/or a BZ (see Figure 3-6).
- A CVZ may be a secondary zone designation. Quarantine and movement control requirements, surveillance requirements, and biosecurity procedures for a CA (IZ and BZ) apply to a CVZ.
- Animals receiving emergency vaccination within a CVZ may be subject to vaccinated animal traceability and DIVA testing, as determined by the Incident Command (IC).
- Depending upon the circumstances of the outbreak, the emergency vaccination strategy within a CVZ may be one or more of the following:
  - Suppressive vaccination strategy (for example, stamping-out modified with emergency vaccination to kill or to slaughter).
  - Protective vaccination strategy (for example, stamping-out modified with emergency vaccination to live).
  - Protective vaccination strategy (for example, emergency vaccination to live without stamping-out).

Figure 3-6. Examples of Containment Vaccination Zones

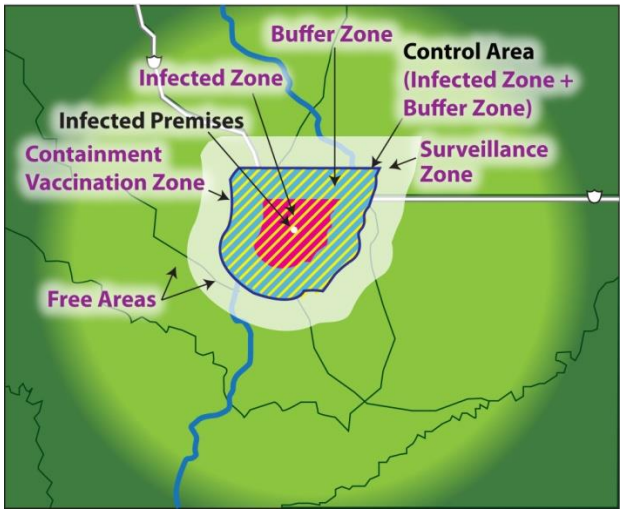
Emergency Vaccination in Infected Zone



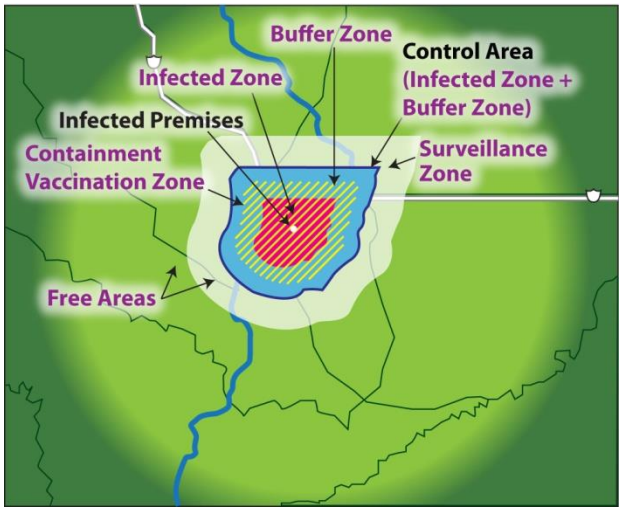
Emergency Vaccination in Buffer Zone



Emergency Vaccination in Control Area



Emergency Vaccination Partial BZ and IZ



Note: Figures are not to scale.

3.1.7 Protection Vaccination Zone

- A PVZ is an emergency vaccination zone, typically outside the CA (see Figure 3-7).
- A PVZ may be subject to movement control requirements, surveillance requirements, and biosecurity procedures. A PVZ may be a secondary zone designation.
- Animals receiving emergency vaccination within a PVZ may be subject to vaccinated animal traceability and DIVA testing, as determined by IC.

- A PVZ is consistent with the World Organization for Animal Health (OIE) definition for a Protection Zone. A Protection Zone is defined by the OIE as

  a zone established to protect the health status of animals in a free country or free zone, from those in a country or zone of a different animal health status, using measures based on the epidemiology of the disease under consideration to prevent spread of the causative pathogenic agent into a free country or free zone. These measures may include, but are not limited to, vaccination, movement control and an intensified degree of surveillance.

  More information can be found at the OIE website, www.oie.int.

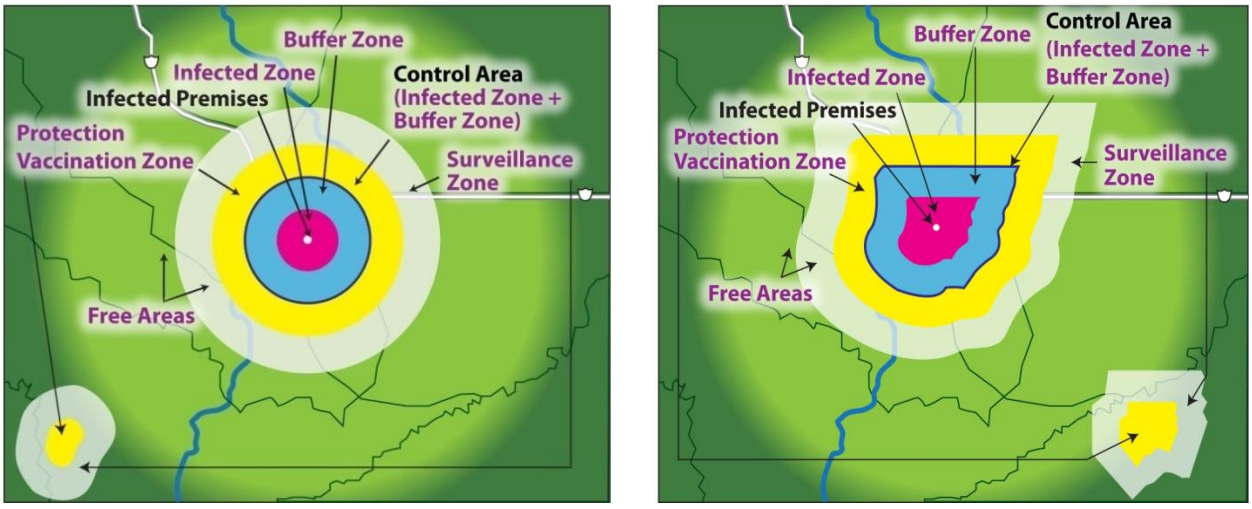
- Depending upon the circumstances of the outbreak, the emergency vaccination strategy within a PVZ may be one or more of the following:

  - Protective vaccination strategy (for example, stamping-out modified with emergency vaccination to live).

  - Protective vaccination strategy (for example, emergency vaccination to live without stamping-out).

  - Suppressive vaccination strategy (for example, stamping-out modified with emergency vaccination to kill or to slaughter).

Figure 3-7. Protection Vaccination Zone



Note: Figures are not to scale. The smaller zones on the lower left or right hand corner of the above figures illustrate an example of another PVZ, and associated SZ, which is not surrounding a CA.

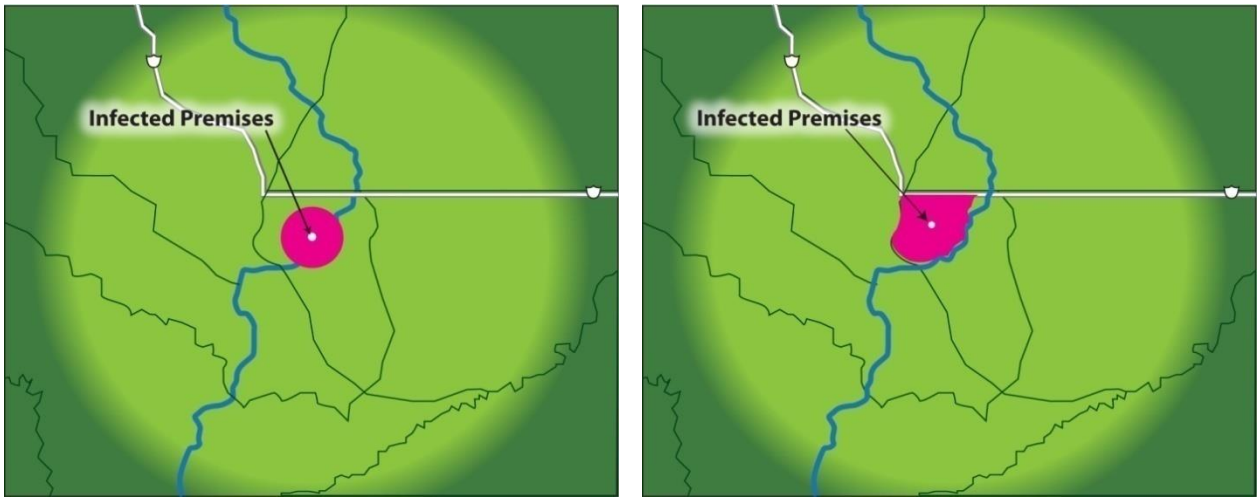
3.2 PREMISES

In general, any animal disease outbreak involves six types of premises: 1) IP; 2) CP; 3) SP; 4) ARP; 5) MP; and 6) Free Premises (FP). If emergency vaccination is used, there will be a seventh type, Vaccinated Premises (VP).

3.2.1 Infected Premises

- An IP is located in an IZ (see Figure 3-8).
- An IP is a premises where a presumptive positive case or confirmed positive case exists as determined by laboratory results, compatible clinical signs, case definition, and international standards.
- All presumptive and confirmed positive premises are classified as an IP. In addition, all other premises that meet the current case definition are classified as an IP.

Figure 3-8. Infected Premises



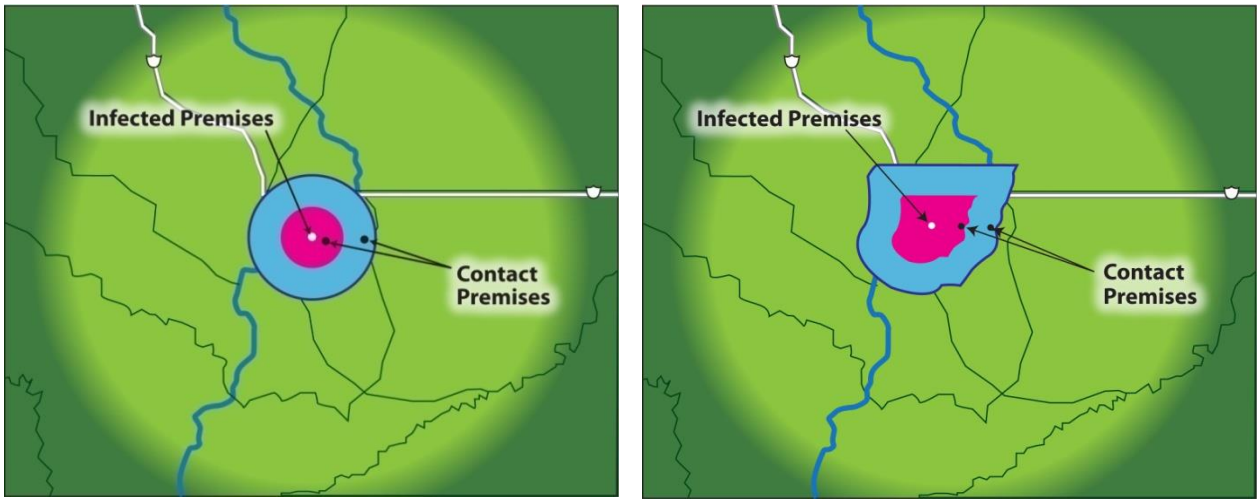
Note: Figures are not to scale.

3.2.2 Contact Premises

- A CP can be located in an IZ or BZ (see Figure 3-9).
- A CP is a premises with susceptible animals that may have been exposed to the FAD agent, either directly or indirectly, including but not limited to exposure to animals, animal products, fomites, or people from an IP. The specific transmission characteristics of the FAD agent should be considered when assigning the CP designation.
- A premises that is contiguous to an IP may also be classified as a CP.

- If a CP is identified outside a CA, it may be surrounded by a BZ until the disposition of the CP is determined. A CP designation outside of a CA in a BZ is intended to be a short-term designation.
- A CP will be subject to quarantine and movement controls, surveillance requirements, and strict biosecurity procedures. Other disease control measures may include depopulation and disposal of susceptible animals as determined by IC.
- If the susceptible animals on a CP are not depopulated, they will be placed under surveillance in accordance with the surveillance plan.
- Following epidemiological investigation, surveillance requirements, diagnostic test results, and biosecurity requirements, a CP within a CA can be designated as an IP, ARP, or an MP. If a CP is in a BZ outside of a CA, the BZ will be removed if the premises is not infected. If the premises is infected, a CA, comprising an IZ and BZ, will be placed around the IP.

Figure 3-9. Contact Premises



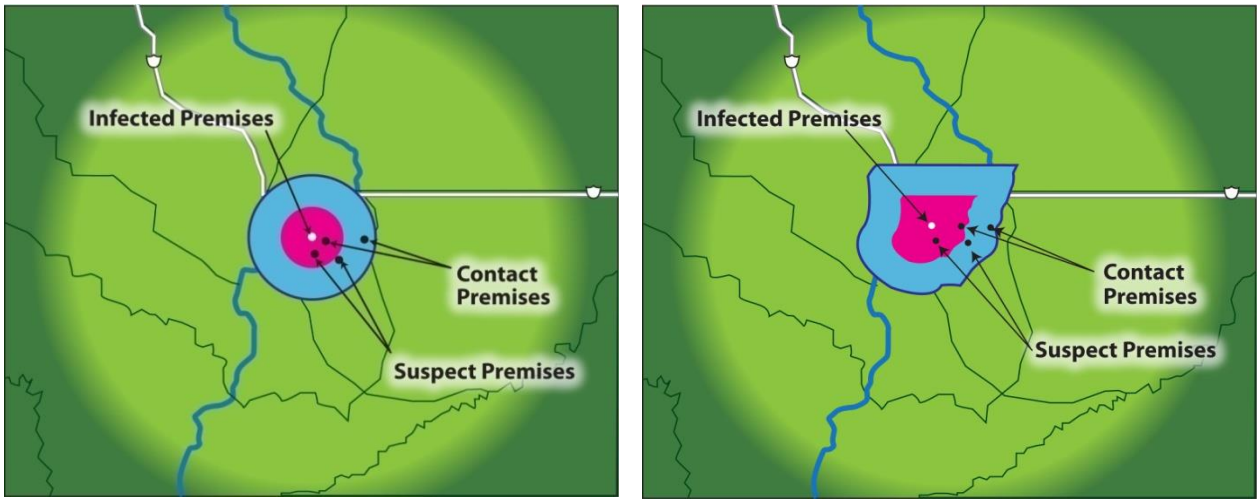
Note: Figures are not to scale.

3.2.3 Suspect Premises

- An SP can be located in an IZ, BZ, SZ, or VZ (see Figure 3-10).
- An SP is a premises under investigation due to the presence of susceptible animals reported to have clinical signs compatible with the FAD. This is intended to be a short-term premises designation.
- An SP is subject to quarantine and movement controls, surveillance requirements, and strict biosecurity procedures.

- Surveillance will be conducted in accordance with the surveillance plan.
- Following complete epidemiological investigation, surveillance requirements, and biosecurity requirements, an SP can be designated as an IP, CP, ARP, or MP if in a CA, as an FP if in an SZ or VZ.

Figure 3-10. Suspect Premises

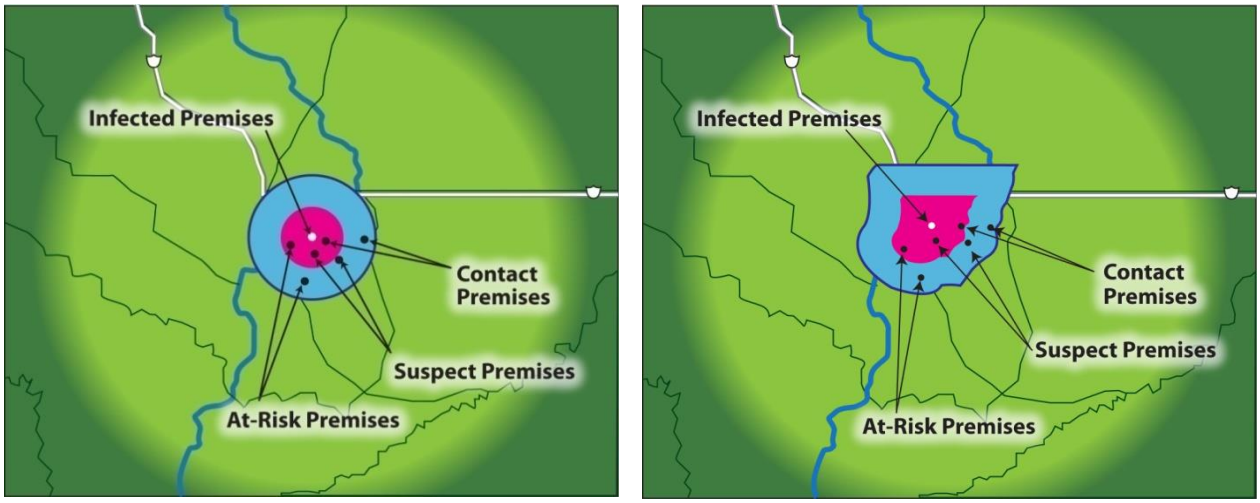


Note: Figures are not to scale.

3.2.4 At-Risk Premises

- An ARP can be located in an IZ or BZ (see Figure 3-11).
- An ARP is a premises with susceptible animals, but none have clinical signs compatible with the FAD.
- An ARP must objectively demonstrate that it is not an IP, CP, or SP.
- An ARP is subject to movement control requirements, surveillance requirements, and biosecurity procedures established for a CA.
- An ARP that seeks to move susceptible animals or animal products within a CA will require a permit approved by IC and must use appropriate biosecurity procedures.
- An ARP that seeks to move susceptible animals or animal products out of a CA will need to meet the requirements to be reclassified as an MP.

Figure 3-11. At-Risk Premises

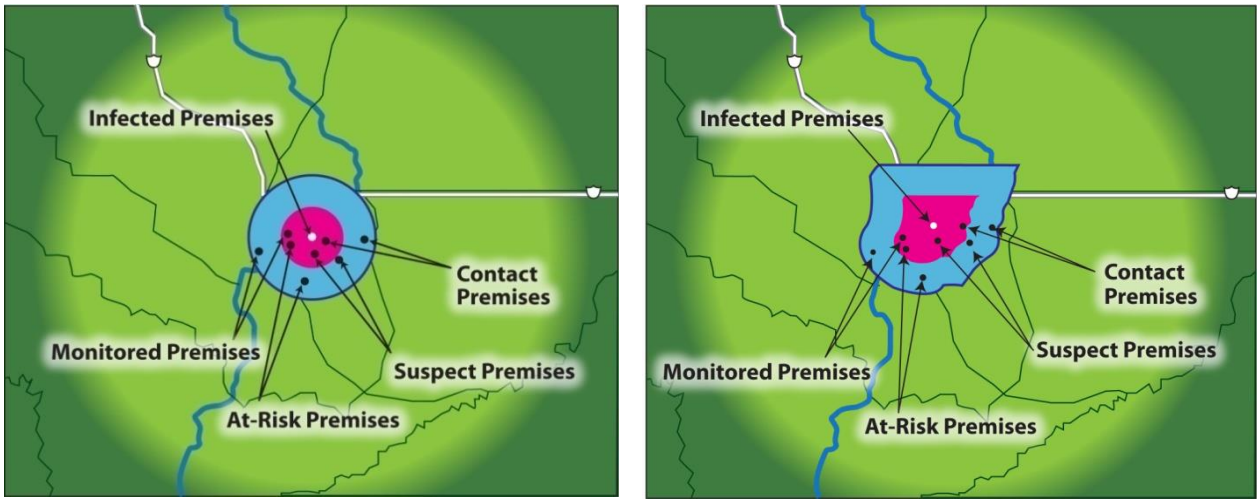


Note: Figures are not to scale.

3.2.5 Monitored Premises

- An MP is located in a CA (IZ or BZ).
- An MP objectively demonstrates that it is not an IP, CP, or SP (see Figure 3-12).
- Only an ARP is eligible to become an MP.
- An MP is subject to epidemiological investigation, risk assessments, surveillance requirements, and biosecurity procedures.
- An MP meets a set of defined criteria in seeking to move susceptible animals or animal products out of a CA by permit.
- For movement of susceptible animals and animal products out of a CA to the FA, the permit process must take into consideration any international standards or conditions for such movement. In addition, commodity-specific proactive risk assessments, continuity of business plans, and movement and marketability plans will be considered.

Figure 3-12. Monitored Premises

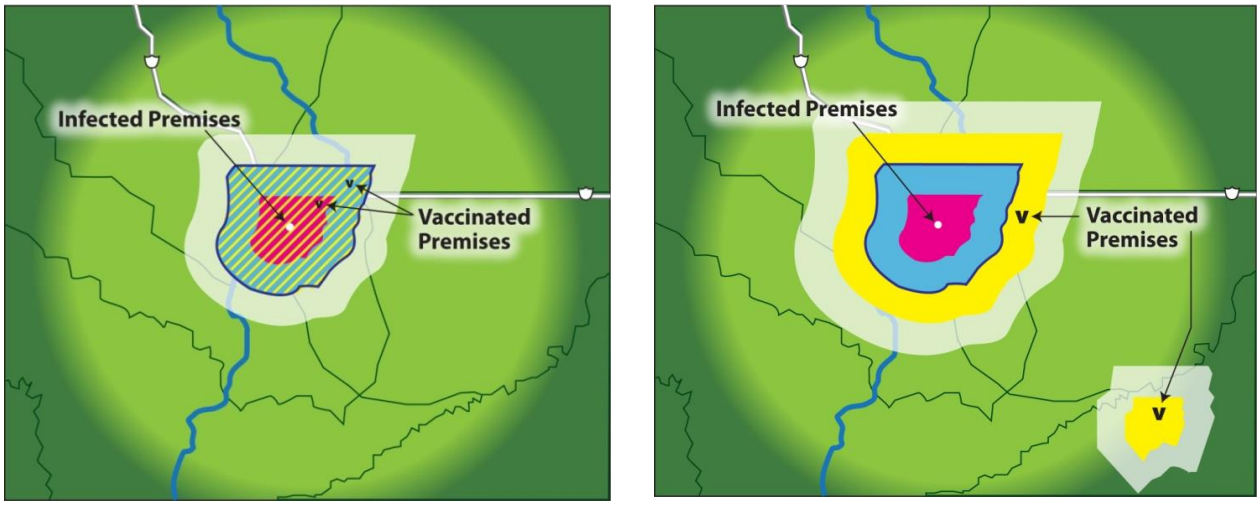


Note: Figures are not to scale.

3.2.6 Vaccinated Premises

- A VP may be located in a CVZ, typically inside a CA (IZ and BZ) or in a PVZ, typically outside a CA.
- A VP is a premises where emergency vaccination has been performed. VP may be a secondary premises designation (see Figure 3-13).
- A VP may be subject to the risk assessments, surveillance requirements, and biosecurity procedures established for the primary premises designation as established by IC.
- Animals receiving emergency vaccination on a VP may be subject to vaccinated animal traceability and DIVA testing.
- For movement of emergency vaccinated animals, consideration must be given to any national or international standards or conditions for such movement.

Figure 3-13. Vaccinated Premises

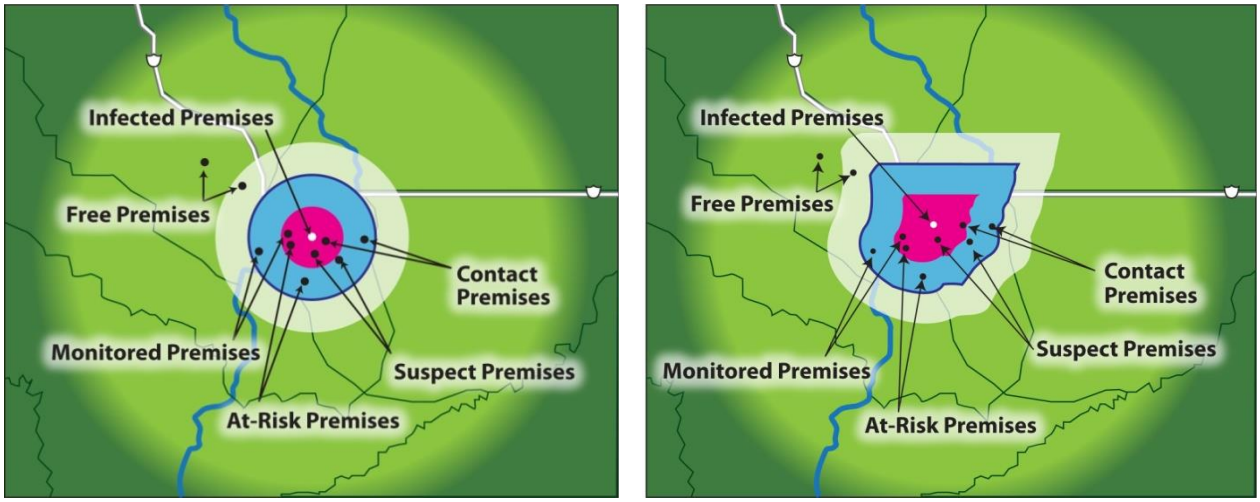


Note: Figures are not to scale. The smaller zone on the lower right hand corner of the above figure illustrates an example PVZ, and associated SZ, which is not surrounding a CA.

3.2.7 Free Premises

- An FP is a premises outside of a CA and not a CP or SP (see Figure 3-14).
- An FP can be located within an SZ or elsewhere in the FA.

Figure 3-14. Free Premises



Note: Figures are not to scale.

3.3 SUMMARY: ZONES, AREAS, PREMISES

Table 3-2 summarizes the premises designations that would be employed in an FAD outbreak response. Table 3-3 summarizes the zone and area designations that would be used in an FAD outbreak response.

Table 3-2. Summary of Premises Designations

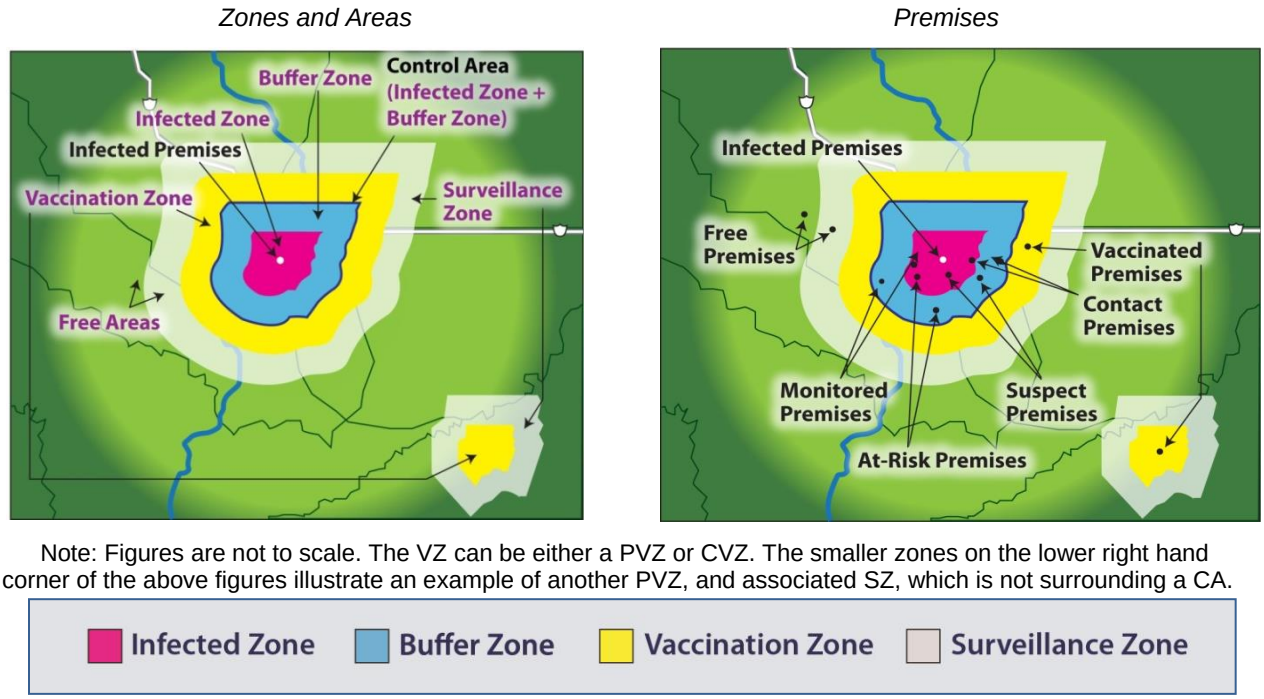
Premises	Definition	Zone
Infected Premises (IP)	Premises where a presumptive positive case or confirmed positive case exists based on laboratory results, compatible clinical signs, case definition, and international standards.	Infected Zone
Contact Premises (CP)	Premises with susceptible animals that may have been exposed to the FAD agent, either directly or indirectly, including but not limited to exposure to animals, animal products, fomites, or people from Infected Premises.	Infected Zone, Buffer Zone
Suspect Premises (SP)	Premises under investigation due to the presence of susceptible animals reported to have clinical signs compatible with the FAD. This is intended to be a short-term premises designation.	Infected Zone, Buffer Zone, Surveillance Zone, Vaccination Zone
At-Risk Premises (ARP)	Premises that have susceptible animals, but none of those susceptible animals have clinical signs compatible with the FAD. Premises objectively demonstrates that it is not an Infected Premises, Contact Premises, or Suspect Premises. At-Risk Premises may seek to move susceptible animals or products within the Control Area by permit. Only At-Risk Premises are eligible to become Monitored Premises.	Infected Zone, Buffer Zone
Monitored Premises (MP)	Premises objectively demonstrates that it is not an Infected Premises, Contact Premises, or Suspect Premises. Only At-Risk Premises are eligible to become Monitored Premises. Monitored Premises meet a set of defined criteria in seeking to move susceptible animals or products out of the Control Area by permit.	Infected Zone, Buffer Zone
Free Premises (FP)	Premises outside of a Control Area and not a Contact or Suspect Premises.	Surveillance Zone, Free Area
Vaccinated Premises (VP)	Premises where emergency vaccination has been performed. This may be a secondary premises designation.	Containment Vaccination Zone, Protection Vaccination Zone

Table 3-3. Summary of Zone and Area Descriptions

Zone/area	Definition
Infected Zone (IZ)	Zone that immediately surrounds an Infected Premises.
Buffer Zone (BZ)	Zone that immediately surrounds an Infected Zone or a Contact Premises.
Control Area (CA)	Consists of an Infected Zone and a Buffer Zone.
Surveillance Zone (SZ)	Zone outside and along the border of a Control Area. The Surveillance Zone is part of the Free Area.
Free Area (FA)	Area not included in any Control Area. Includes the Surveillance Zone.
Vaccination Zone (VZ)	Emergency Vaccination Zone classified as either a Containment Vaccination Zone (typically inside a Control Area) or a Protection Vaccination Zone (typically outside a Control Area). This may be a secondary zone designation.

Figure 3-15 illustrates all the zones and premises.

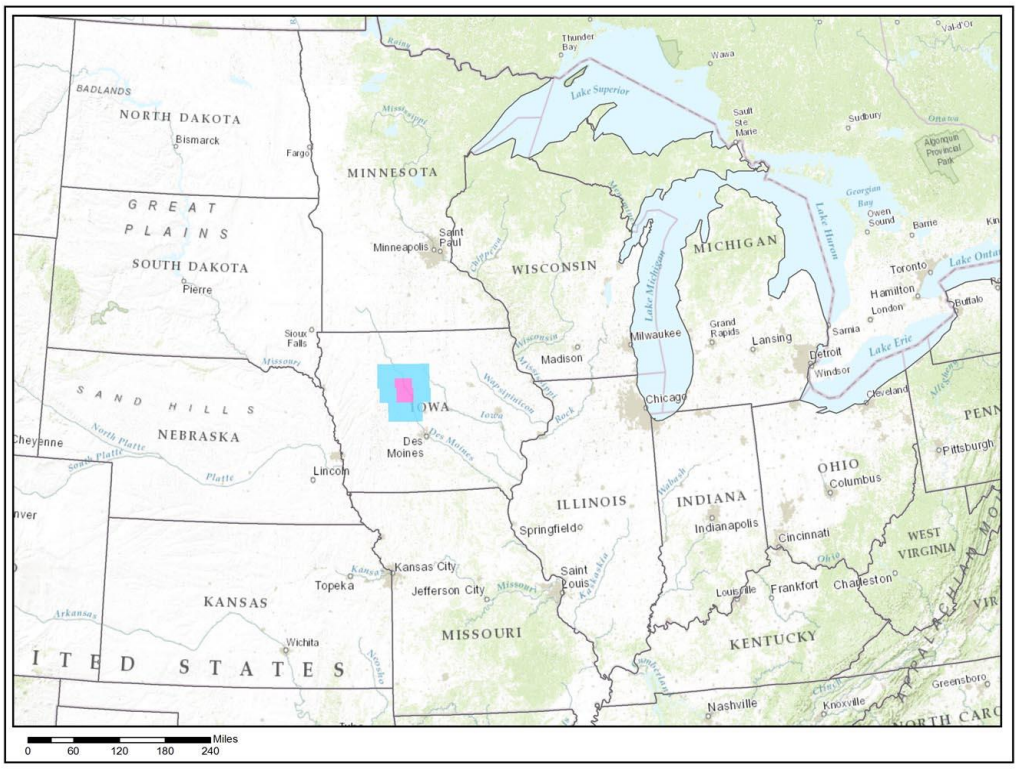
Figure 3-15. Example of Zones, Areas, and Premises



Note: Figures are not to scale. The VZ can be either a PVZ or CVZ. The smaller zones on the lower right hand corner of the above figures illustrate an example of another PVZ, and associated SZ, which is not surrounding a CA.

Figures 3-16a–e are applied examples of zones using the State of Iowa. None of the figures include a depiction of an SZ because the size of the zone may vary and change depending on factors such as the nature of the disease agent, demographics of surrounding area, and known epidemiological information. These maps are courtesy of CEAH Information Management and Analytic Support Unit.

Figure 3-16a. Small Infected Zone and Buffer Zone

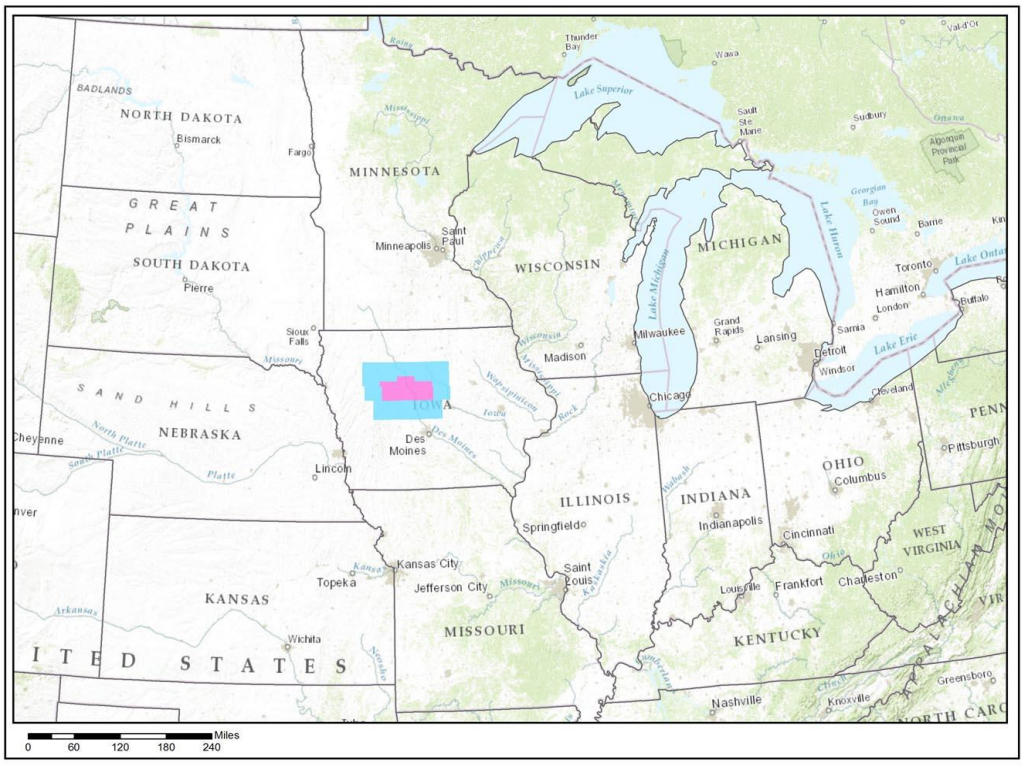


Iowa Outbreak: One Infected County

Where	Bovine	Swine	Sheep/Goats	Operations
Infected Zone	7,083	183,865	598	208
Buffer Zone	93,455	2,216,816	6,556	1,496
Total	100,538	2,400,681	7,154	1,704

Total livestock affected: 2,508,373.
Data source: National Agricultural Statistics Service (NASS), 2012, http://quickstats.nass.usda.gov/.
Data may be incomplete; counties may choose not to report.
Best available data incorporated.
Affected area: 8 counties.

Figure 3-16b. Medium Infected Zone and Buffer Zone

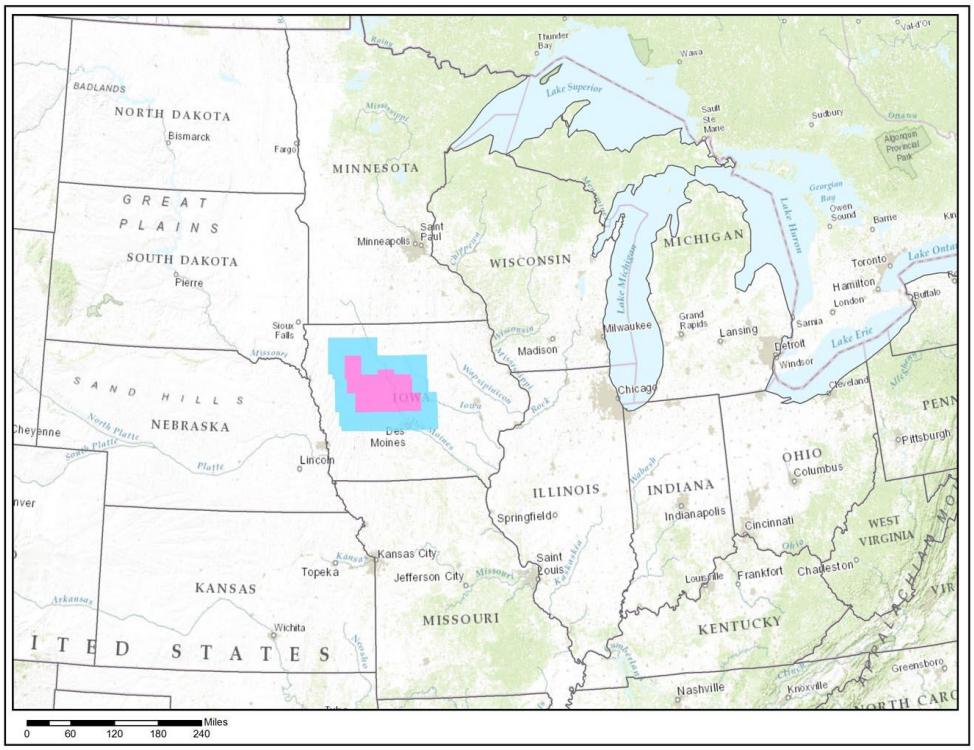


Iowa Outbreak: Three Infected Counties

Where	Bovine	Swine	Sheep/Goats	Operations
Infected Zone	31,838	1,189,109	2,779	667
Buffer Zone	289,558	3,980,202	13,968	3,162
Total	321,396	5,169,311	16,747	3,829

Total livestock affected: 5,507,454.
Data source: NASS, 2012, http://quickstats.nass.usda.gov/.
Data may be incomplete; counties may choose not to report.
Best available data incorporated.
Affected area: 14 counties.

Figure 3-16c. Large Infected Zone and Buffer Zone

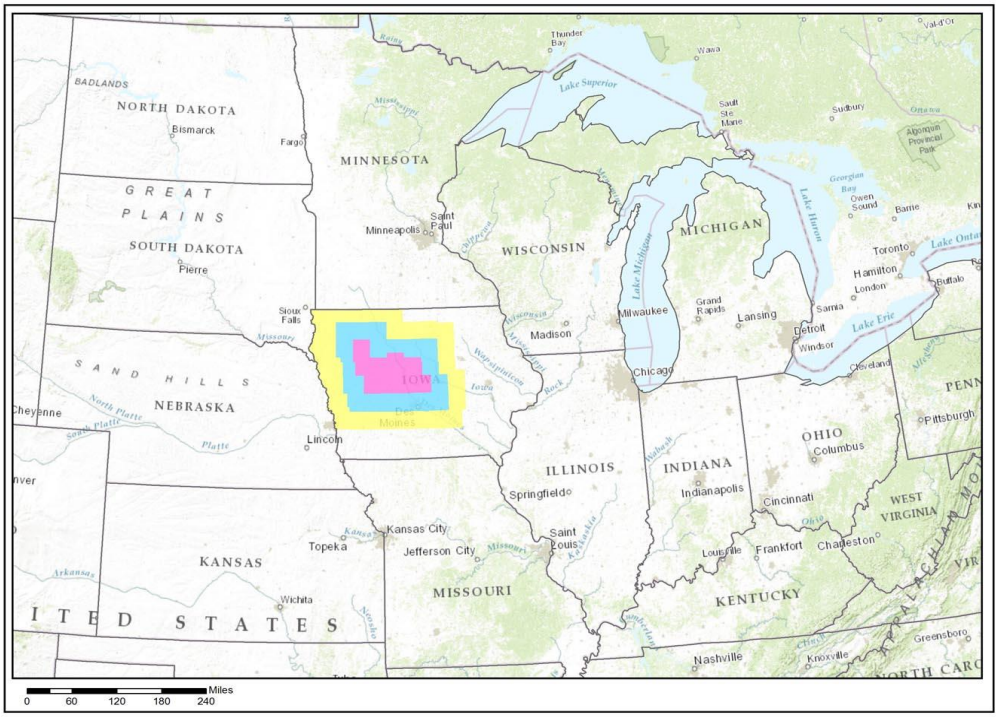


Iowa Outbreak: Nine Infected Counties

Where	Bovine	Swine	Sheep/Goats	Operations
Infected Zone	252,829	3,025,683	14,391	2,729
Buffer Zone	502,389	4,999,308	22,140	5,515
Total	755,218	8,024,991	36,531	8,244

Total livestock affected: 8,816,740.
Data source: NASS, 2012, http://quickstats.nass.usda.gov/.
Data may be incomplete; counties may choose not to report.
Best available data incorporated.
Affected area: 27 counties.

Figure 3-16d. Protection Vaccination Zone



Iowa Outbreak: Nine Infected Counties + Vaccination Zone

Where	Bovine	Swine	Sheep/Goats	Operations
Infected Zone	252,829	3,025,683	14,391	2,729
Buffer Zone	502,389	4,999,308	22,140	5,515
Vaccination Zone	1,323,363	5,859,894	51,596	9,639
Total	2,078,581	13,884,885	88,127	17,883

Total livestock affected: 16,051,593.
Data source: NASS, 2012, http://quickstats.nass.usda.gov/.
Data may be incomplete; counties may choose not to report.
Best available data incorporated.
Affected area: 51 counties.

Figure 3-16e. Large Infected Zone and State-Wide Buffer Zone

Iowa Outbreak: Nine Infected Counties and Large Buffer Zone

Where	Bovine	Swine	Sheep/Goats	Operations
Infected Zone	252,829	3,025,683	14,391	2,729
Buffer Zone	3,591,723	17,218,848	161,752	35,189
Total	3,844,552	20,244,531	176,143	37,918

Total livestock affected: 24,265,226.
Data source: NASS, 2012, http://quickstats.nass.usda.gov/.
Data may be incomplete; counties may choose not to report.
Best available data incorporated.
Affected area: 99 counties.

Table 3-4 lists the minimum sizes of zones and areas during an FAD outbreak.

Table 3-4. Minimum Sizes of Zones and Areas

Zone or area	Minimum size and details
Infected Zone (IZ)	◆ Perimeter should be at least 3 km (~1.86 miles) beyond perimeters of presumptive or confirmed Infected Premises. This will depend on disease agent and epidemiological circumstances. This zone may be redefined as the outbreak continues.
Buffer Zone (BZ)	◆ Perimeter should be at least 7 km (~4.35 miles) beyond the perimeter of the Infected Zone. Width is generally not less than the minimum radius of the associated Infected Zone, but may be much larger. This zone may be redefined as the outbreak continues.
Control Area (CA)	◆ Perimeter should be at least 10 km (~6.21 miles) beyond the perimeter of the closest Infected Premises. Please see Table 3-1 for factors to consider in determining the size of a Control Area. This area may be redefined as the outbreak continues.
Surveillance Zone (SZ)	◆ Width should be at least 10 km (~6.21 miles), but may be much larger.

Table 3-5 lists the minimum sizes of zones and areas during vector-borne outbreaks (spread by mosquitoes or *Culicoides*).

Table 3-5. Minimum Sizes of Zones and Areas for Mosquito or Culicoides Vector-Borne Diseases

Zone or area	Minimum size and details
Infected Zone (IZ)	◆ Perimeter should be at least 10 km (~6.2 miles) beyond perimeters of presumptive or confirmed Infected Premises. This will depend on disease agent and epidemiological circumstances. This zone may be redefined as the outbreak continues.
Buffer Zone (BZ)	◆ Perimeter should be at least 20 km (~12.4 miles) beyond the perimeter of the Infected Zone. Width is generally not less than the minimum radius of the associated Infected Zone, but may be much larger. This zone may be redefined as the outbreak continues.
Control Area (CA)	◆ Perimeter should be at least 30 km (~18.6 miles) beyond the perimeter of the closest Infected Premises. Please see Table 3-1 for factors to consider in determining the size of a Control Area. This area may be redefined as the outbreak continues.
Surveillance Zone (SZ)	◆ Width should be at least 20 km (~12.4 miles) but may be larger depending on the known geographic range of vector.

3.4 Summary: Permits to Move into, Within, and Out of a Control Area

Tables 3-6, 3-7, and 3-8 provide guidelines for moving into, within, and out of a CA. See disease-specific response plans as well as continuity of business plans for commodity-specific information.

Table 3-6. Movement into Control Area from Outside Control Area to Specific Premises[a]

Item moving into a Control Area to a/an… →	Infected Premises	Suspect Premises[b]	Contact Premises[b]	At-Risk Premises	Monitored Premises
Susceptible livestock or poultry	Prohibited, except under certain circumstances as determined by the IC, such as slaughter.	Prohibited, except under certain circumstances as determined by the IC, such as slaughter.	Prohibited, except under certain circumstances as determined by the IC, such as slaughter.	Permit for movement must be approved by the IC with appropriate biosecurity measures.	Permit for movement must be approved by the IC with appropriate biosecurity measures.
Susceptible animal products	See disease specific or continuity of business plans (Secure Food Supply Plans) for information on susceptible animal products or guidance as determined by the IC.				
Other animals (non-susceptible livestock or poultry) from premises **with** susceptible species	Prohibited unless permit approved by IC and appropriate biosecurity measures.	Prohibited unless permit approved by IC and appropriate biosecurity measures.	Prohibited unless permit approved by IC and appropriate biosecurity measures.	Allowed with appropriate biosecurity measures. IC may require a permit for movement depending upon FAD and characteristics of destination premises.	Allowed with appropriate biosecurity measures. IC may require a permit for movement depending upon FAD and characteristics of destination premises.
Other animals or animal products (non-susceptible livestock or poultry/products) from premises **without** susceptible species	IC will determine movement restrictions based on FAD and characteristics of destination premises.	IC will determine movement restrictions based on FAD and characteristics of destination premises.	IC will determine movement restrictions based on FAD and characteristics of destination premises.	Allowed with appropriate biosecurity measures. IC may require a permit for movement depending upon FAD and characteristics of destination premises.	Allowed with appropriate biosecurity measures. IC may require a permit for movement depending upon FAD and characteristics of destination premises.
Equipment, vehicles, and other fomites from premises **with** susceptible species	Allowed with appropriate biosecurity measures.	Allowed with appropriate biosecurity measures.	Allowed with appropriate biosecurity measures.	Allowed with appropriate biosecurity measures.	Allowed with appropriate biosecurity measures.
Semen, embryos from susceptible livestock or poultry	Prohibited.	Prohibited.	Prohibited.	Allowed with appropriate biosecurity measures.	Allowed with appropriate biosecurity measures.

[a] Movement control and permit processes will change over time depending on situational awareness and operational capabilities.

[b] Contact Premises and Suspect Premises are intended to be short-term premises designations. Ideally, these premises should be re-designated before movements occur.

Table 3-7. Movement within a Control Area[a]

Item moving within a Control Area from a/an… →	Infected Premises	Suspect Premises[b]	Contact Premises[b]	At-Risk Premises	Monitored Premises
Susceptible livestock or poultry	Prohibited, except under certain circumstances as determined by the IC, such as slaughter.	Prohibited, except under certain circumstances as determined by the IC, such as slaughter.	Prohibited, except under certain circumstances as determined by the IC, such as slaughter.	Allowed to move by permit approved by the IC; surveillance, negative diagnostic tests, premises biosecurity, and risk-assessment may be required for permit.	Allowed to move by permit approved by the IC; surveillance, negative diagnostic tests, premises biosecurity, and risk-assessment may be required for permit.
Susceptible animal products	See disease specific or continuity of business plans (Secure Food Supply Plans) for information on susceptible animal products or guidance as determined by the IC.				
Other animals (non-susceptible livestock or poultry) from premises **with** susceptible species	Prohibited unless specific permit granted by IC and appropriate biosecurity measures.	Prohibited unless specific permit granted by IC and appropriate biosecurity measures.	Prohibited unless specific permit granted by IC and appropriate biosecurity measures.	Allowed to move by permit approved by the IC; surveillance, negative diagnostic tests, premises biosecurity, and risk-assessment may be required for permit.	Allowed to move by permit approved by the IC; surveillance, negative diagnostic tests, premises biosecurity, and risk-assessment may be required for permit.
Other animals or animal products (non-susceptible livestock or poultry/ products) from premises **without** susceptible species	N/A (Infected Premises have susceptible species).	N/A (Suspect Premises have susceptible species).	N/A (Contact Premises have susceptible species).	N/A (At-Risk Premises have susceptible species).	N/A (Monitored Premises have susceptible species).
Equipment, vehicles, and other fomites from premises **with** susceptible species	Prohibited unless specific permit granted by IC and appropriate biosecurity measures.	Prohibited unless specific permit granted by IC and appropriate biosecurity measures.	Prohibited unless specific permit granted by IC and appropriate biosecurity measures.	Allowed by permit approved by IC and appropriate biosecurity measures.	Allowed by permit approved by IC and appropriate biosecurity measures.
Semen, embryos from susceptible livestock or poultry	Prohibited.	Prohibited.	Prohibited.	Allowed by permit approved by IC and appropriate biosecurity measures.	Allowed by permit approved by IC and appropriate biosecurity measures.

[a] Movement control and permit processes will change over time depending on situational awareness and operational capabilities.

[b] Contact Premises and Suspect Premises are intended to be short-term premises designations. Ideally, these premises should be re-designated before movements occur.

Table 3-8. Movement from Inside a Control Area to Outside a Control Area from Specific Premises[a]

Item moving out of a Control Area from a/an… →	Infected Premises	Suspect Premises[b]	Contact Premises[b]	At-Risk Premises	Monitored Premises[c]
Susceptible livestock or poultry	Prohibited, except under certain circumstances as determined by the IC.	Prohibited, except under certain circumstances as determined by the IC.	Prohibited, except under certain circumstances as determined by the IC.	At-Risk Premises must become Monitored Premises to move susceptible livestock or poultry out of a Control Area.	Allowed to move by permit approved by IC; surveillance, negative diagnostic tests, premises biosecurity, and risk-assessment may be required for permit.
Susceptible animal products	See disease specific or continuity of business plans (Secure Food Supply Plans) for information on susceptible animal products or guidance as determined by the IC.				
Other animals (non-susceptible livestock or poultry) from premises **with** susceptible species	Prohibited unless specific permit approved by IC and appropriate biosecurity measures and risk-assessment.	Prohibited unless specific permit approved by IC and appropriate biosecurity measures and risk-assessment.	Prohibited unless specific permit approved by IC and appropriate biosecurity measures and risk-assessment.	Allowed to move by permit approved by IC; surveillance and negative diagnostic tests for susceptible animals on premises, premises biosecurity, and risk-assessment may be required for permit.	Allowed to move by permit approved by IC; surveillance and negative diagnostic tests for susceptible animals on premises, premises biosecurity, and risk-assessment may be required for permit.
Other animals or animal products (non-susceptible livestock or poultry/ products) from premises **without** susceptible species	N/A (Infected Premises have susceptible species).	N/A (Suspect Premises have susceptible species).	N/A (Contact Premises have susceptible species).	N/A (At-Risk Premises have susceptible species).	N/A (Monitored Premises have susceptible species).
Equipment, vehicles, and other fomites from premises **with** susceptible species	Prohibited unless permit approved by IC and appropriate biosecurity measures.	Prohibited unless permit approved by IC and appropriate biosecurity measures.	Prohibited unless permit approved by IC and appropriate biosecurity measures.	Allowed by permit approved by IC and appropriate biosecurity measures.	Allowed by permit approved by IC and appropriate biosecurity measures.
Semen, embryos from susceptible livestock or poultry	Prohibited.	Prohibited.	Prohibited.	At-Risk Premises must become Monitored Premises to move semen, embryos from susceptible livestock or poultry out of a Control Area.	Monitored Premises only allowed by permit approved by IC and appropriate biosecurity measures.

[a] Movement control and permit processes will change over time depending on situational awareness and operational capabilities.

[b] Contact Premises and Suspect Premises are intended to be short-term premises designations. Ideally, these Premises should be re-designated before movements occur.

[c] Continuity of business plans may apply.

Appendix A
FAD PReP Document Structure

A. FAD PReP Strategic Documents (Concept of Operations)

- APHIS Foreign Animal Disease Framework: Roles and Coordination (FAD PReP Manual 1-0)
- APHIS Foreign Animal Disease Framework: Response Strategies (FAD PReP Manual 2-0)
- Incident Coordination Group Plan (FAD PReP Manual 3-0)
- Foreign Animal Disease Investigation Manual (FAD PReP Manual 4-0)
- A Partial Listing of Foreign Animal Disease Stakeholders (FAD PReP Manual 5-0)

B. NAHEMS Guidelines

Each National Animal Health Emergency Management System (NAHEMS) Guidelines document also has accompanying educational materials, including presentations and handouts.

- Health and Safety
- Personal Protective Equipment (PPE)
- Biosecurity
- Quarantine and Movement Control
- Mass Depopulation and Euthanasia
- Disposal
- Cleaning and Disinfection
- Vaccination for Contagious Diseases
  - Appendix A Foot-and-Mouth Disease (FMD)

- Appendix B Classical Swine Fever (CSF)
- Appendix C Highly Pathogenic Avian Influenza (HPAI)

- Wildlife Management and Vector Control for foreign animal disease Response in Domestic Livestock
- Surveillance, Epidemiology, and Tracing
- Continuity of Business
- Information Management

C. INDUSTRY MANUALS

- Dairy
- Swine
- Poultry
- Beef Feedlot
- Cow-Calf

D. DISEASE RESPONSE PLANS

- HPAI
- FMD
  - Classification of Phases and Types of a Foot-and-Mouth Disease Out-break and Response (draft 2013)
- CSF
- Newcastle Disease (ND)

E. DISEASE STRATEGIES

- African Swine Fever
- Japanese Encephalitis
- New World Screwworm Myiasis

- Peste Des Petits Ruminants
- Rift Valley Fever

F. STANDARD OPERATING PROCEDURES

There are 23 critical activities conducted during a response to an FAD. Many of these activities have associated standard operating procedures (SOPs). These SOPs are templates to provide a common picture or set of procedures for the following 23 activities and tools.

1. Overview of Etiology and Ecology
2. Case Definitions and Laboratory Definitions
3. Surveillance
4. Diagnostics (Sample Collection, Surge Capacity, and Reporting)
5. Epidemiological Investigation and Tracing
6. Overview of Information Management
7. Communications
8. Health and Safety and PPE
9. Biosecurity
10. Quarantine and Movement Control
11. Continuity of Business
12. Overview of Regionalization for International Trade
13. Mass Depopulation and Euthanasia
14. Disposal
15. Cleaning and Disinfection
16. Vaccination
17. Logistics
18. Overview of Wildlife Management and Vector Control
19. Overview of Animal Welfare

20. Overview of Modeling and Assessment Tools

21. Appraisal and Compensation

22. Overview of Finance

23. Overview of Incident Management

G. Continuity of Business Planning/Secure Food Supply Plans

- Secure Egg Supply Plan
- Secure Milk Supply Plan
- Secure Turkey Supply Plan
- Secure Pork Supply Plan
- Secure Broiler Supply Plan

H. Outbreak Response Tools

- Outbreak Surveillance Toolbox
- Technique for the Assessment of Intervention Options
- Case Definitions
  - African horse sickness
  - African swine fever
  - H5/H7 Avian influenza (notifiable)
  - CSF
  - Contagious bovine pleuropneumonia
  - Contagious equine metritis
  - Eastern equine encephalomyelitis
  - FMD
  - Hendra-Nipah

- Japanese encephalitis
- ND (virulent)
- Rift Valley fever
- Venezuelan equine encephalomyelitis
- Western equine encephalomyelitis
- West Nile virus

I. READY REFERENCE GUIDES

In addition, there are a number of FAD PReP Ready Reference Guides that correspond to the above materials as well as other current topics. For example, there are Ready Reference Guides on the following topics (listed in alphabetical order by disease):

- CSF Response
  - Overview of the CSF Response Plan: The Red Book Draft
- FMD Response
  - Etiology and Ecology
  - Communications
  - Overview of the FMD Response Plan: The Red Book Draft
  - Understanding Response Strategies
  - Overview of Emergency Vaccination
  - Overview of FMD Vaccination Issues
  - Common Operating Procedure
  - Overview of FMD Freedom and Vaccination
  - Comparing US and UK FMD Response Planning
  - Quarantine, Movement Control, and Continuity of Business
  - Surveillance

- Overview of Diagnostics
- Additional Information

- Generic FAD Response
  - Introduction to the FAD Preparedness and Response Plan
  - Introduction to the Emergency Management Response System (EMRS) 2
  - Understanding EMRS 2 Interface
  - FAD Framework: Roles and Coordination (Manual 1-0)
  - FAD Framework: Response Strategies (Manual 2-0)
  - Critical Activities and Tools during an FAD Response
  - Secure Food Supply Plans
  - Zones, Areas, and Premises in an FAD Outbreak
  - Movement Control in an FAD Outbreak
  - VS Guidance 12001.2: Procedures and Policy for the Investigation of Potential FAD/EDI
- HPAI Response
  - Overview of HPAI Response Plan: The Red Book Draft
  - HPAI Incident 2014–2015: Overview of Zones
  - Etiology and Ecology
- ND Response
  - Overview of the ND Response Plan: The Red Book Draft

These Ready Reference Guides, and others, are available at http://www.aphis.usda.gov/fadprep.

Appendix B
Example Preparedness and Response Goals for Selected Critical Activities

Table B-1 lists example preparedness and response goals for critical activities and tools. These preparedness and response goals help to bolster preparedness planning by providing objectives and improve response efforts by offering general guidelines for implementation of the critical activities and tools. It is important to remember that the goals offered in this section are provided for guidance: each foreign animal disease (FAD) response will be unique, with different situations that must be considered by the Federal, State, Tribal and local entities involved in a response effort.

These examples are compatible with the Core Capabilities List identified in the National Preparedness Goal from the Federal Emergency Management Agency. The Core Capabilities List is an important additional resource for States, Tribes, and localities in developing their own emergency response plans.[1]

[1] Federal Emergency Management Agency, 2015. Core Capabilities. http://www.fema.gov/core-capabilities. Accessed August 14, 2015.

Table B-1. Selected Preparedness and Response Goals

Critical activity	Preparedness goals	Response goals
Etiology and Ecology	• Provide etiology and ecology summaries for high priority FAD and foreign animal pest threats. • Update these summaries at regular intervals.	• Unified Command and stakeholders have a common set of etiology and ecology definitions and descriptions. • Have proper understanding of the FAD or foreign animal pest threat when establishing or revising goals, objectives, strategies, and procedures.
Case Definitions and Laboratory Definitions	• The Center for Epidemiology and Animal Health, in conjunction with Surveillance, Preparedness, and Response Services, will provide case definitions for foreign animal diseases to Federal, State, Tribal, local, and agricultural stakeholders prior to an incident.	• Update case definitions at regular intervals and as needed throughout incidents or outbreaks.
Surveillance	• Develop capabilities and relationships to produce surveillance plans within 24–48 hours of a confirmed outbreak. • Develop effective surveillance plans that can achieve desired outcomes by leveraging available resources, satisfying jurisdictional requirements, and implementing continuity of business measures.	• Implement surveillance plans within 48 hours of the confirmation of an outbreak. • Implement a surveillance plan that will (1) define the present extent of FAD and (2) detect unknown Infected Premises (IP) quickly. • Have the surveillance plan consider the susceptible wildlife population in the area, and coordinate with APHIS Wildlife Services, the Department of Interior, State wildlife agencies, and State agriculture departments to perform appropriate surveillance in wildlife populations. • Provide complete surveillance data summaries and analyses at intervals as specified by Incident Command (IC).
Diagnostics	• Maintain existing capabilities and develop new capabilities for diagnostic testing for FADs. • Establish procedures for surge capacity in an outbreak, and identify gaps in personnel and/or equipment. • Maintain a well-trained, proficient staff.	• Meet the surge requirements for diagnostic testing at specific intervals, starting at time zero and at 24-hour intervals as the response escalates. • Report all diagnostic test results to appropriate personnel and/or information management systems within 12 hours of diagnostic test completion.
Epidemiological Investigation and Tracing	• Define expectations for epidemiological investigation and FAD tracing before an incident or outbreak, especially for highly contagious FADs. • Identify individuals who are trained or experienced in epidemiological investigation and tracing activities.	• Assign a premises designation and priority of investigation within 6 hours of identifying a potential Infected Premises (IP) or Contact Premises (CP) through tracing activities. • Identify all CP within 24 hours of identifying the IP or the initial CP.

Table B-1. Selected Preparedness and Response Goals

Critical activity	Preparedness goals	Response goals
	• Identify and pre-position information management resources, and other resources necessary to support epidemiology activities and tracing in an actual incident or outbreak. • Establish priorities for contact tracing, and for establishing Infected Zone(s), Buffer Zone(s), and Surveillance Zone(s). • Identify the resources needed for different disease agents, and for outbreaks of varying size/scale.	• Determine within 96 hours of identifying the index case, the nature of the FAD outbreak, identify the risk factors for transmission, and develop mitigation strategies.
Information Management	• Ensure that Federal, State, Tribal, local, and Federal information management systems are compatible for sharing data and information. • Identify gaps or weaknesses in current information management systems related to a large-scale FAD outbreak, especially related to communicating incident goals and objectives, status reports, tracing information, premises status information, diagnostic results, epidemiology reports, permits for movement, and resource information. • Improve capabilities for information management for a large-scale or complex outbreak.	• Perform Emergency Management Response System (EMRS) data entry processes or information downloads in 24-hour intervals or less, or as requested by Incident Command. Data entry should be as close to real-time as feasible. • Effectively communicate incident goals and objectives, status reports, tracing information, premises status information, diagnostic results, epidemiology reports, permits for movement, and resource information.
Communication	• Establish a network of stakeholders and systems for communication, prior to an incident or outbreak. • Test or exercise the systems for communication at regular intervals, before an outbreak. • Develop message maps prior to an outbreak.	• Brief the media, public, industry, Congress, trading partners, and others on the FAD outbreak status and the actions being taken to control and eradicate the disease. • Highlight the importance of sound biosecurity practices and steps that producers and other producers and owners can take to protect against infection. • Coordinate with Federal, State, and local agencies, Tribal entities, producer groups, and land grant university-based cooperative extension services to ensure a consistent messaging regarding animal health, public health, and food safety. • Assure consumers that USDA is working on the animal health issues in collaboration with public health agencies on human health issues.

Table B-1. Selected Preparedness and Response Goals

Critical activity	Preparedness goals	Response goals
Health and Safety and PPE	• Develop Site-Specific Health and Safety Plan templates before the incident or outbreak. • Train personnel and/or develop just-in-time training that can be readily available for additional personnel.	• Provide daily pre-entry safety briefings for all response personnel. • Prevent, to every extent possible, adverse human health events related to emergency response efforts.
Biosecurity	• Develop incident biosecurity plans, fixed operation biosecurity plans, and mobile operation biosecurity plans, before the incident or outbreak. • Train personnel and/or develop just-in-time training that can be readily available for additional personnel.	• Ensure that biosecurity procedures to prevent the spread of an FAD agent are implemented within 12–14 hours of identifying the index case.
Quarantine and Movement Control	• Work with stakeholders to develop effective quarantine and movement control plans for affected premises, areas, or regions. • Work with stakeholders to develop effective movement control and permit plans for non-infected premises, areas, or regions.	• Once a Control Area is established, implement quarantine and movement controls as rapidly as possible. • Ensure quarantine and movement controls consider competing priorities, weighing the risk of disease transmission against the need for critical movements (e.g., feed trucks) and business continuity.
Continuity of Business	• Work with industry stakeholders and experts to prioritize animal or commodity movements that have the potential to be affected by the disease or the disease response. • Establish a transparent and effective system for risk assessments, surveillance requirements, biosecurity procedures, and a permitting process in order to promote stakeholder acceptance and compliance with regulatory interventions by Federal, State, and Tribal authorities. • Understand the information management requirements and data necessary for permits and movement in an outbreak.	• Implement an appropriate continuity of business plan for industries or industry segment affected. • Work with industry and Incident Command to facilitate and permit movement of non-infected animals and non-contaminated animal products from non-infected premises. • Ensure permits and movement are effectively captured in EMRS 2.0 in a timely fashion.
Regionalization for International Trade	• Promote science-based international trade policy and procedures. • Develop guidance for regionalization in the United States to respond to an FAD outbreak in the country that facilitates the resumption of international trade involving non-infected animals and unaffected animal products.	• Initiate the implementation of regionalization plans tailored to the specific agent and epidemiological situation as soon as possible during the outbreak response. • Provide trading partners and the World Organization for Animal Health (OIE) relevant outbreak information to support the regionalization plan, including the measures used to provide evidence of disease-freedom in the region.

Table B-1. Selected Preparedness and Response Goals

Critical activity	Preparedness goals	Response goals
Mass Depopulation and Euthanasia	• Develop contingency plans for mass depopulation and exercise those plans. • Develop non-traditional approaches or alternatives to mass depopulation for large scale or catastrophic outbreaks. • Train personnel and/or develop just-in-time training that can be readily available for additional personnel.	• Implement animal-sparing modalities, such as vaccination, where appropriate and permitted by law. • Provide humane treatment at all times until animals are euthanized or depopulated. • Prioritize depopulation by selecting animals which are expressing elevated clinical signs or pose a significant risk of spreading infection first. • Depopulate the affected animal species as quickly, efficiently, and humanely as possible, but in consideration of the extenuating circumstances that surround an animal health emergency. Depopulation within 24 hours may be an appropriate goal for many health incidents. • Minimize, to the extent possible, the emotional and psychological impact on animal owners, caretakers, and their families, and those involved in the actual depopulation activities.
Disposal	• Establish disposal protocols or procedures and options before an outbreak, for consistency and safeguarding, and to meet regulatory requirements. • Identify suitable disposal personnel, supplies, materials, and equipment prior to the incident or FAD outbreak. • Prevent the spread of the disease agent, with little or no effect on the environment, considering community preferences, and conserving meat or animal protein if logistically supportable from a biosecurity viewpoint.	• Properly dispose of contaminated and potentially contaminated materials, including animal carcasses, as soon as possible while maximizing pathogen containment, environmental sustainability, stakeholder acceptance, and cost effectiveness.
Cleaning and Disinfection	• Establish cleaning and disinfecting protocols or procedures before an outbreak, for consistency and safeguarding. • Identify disinfectants (or pesticides) that are U.S. Environmental Protection Agency approved for specific FAD agents. Be able to acquire these disinfectants, both in finite immediate quantities for the start of an FAD incident or outbreak, and in indefinite estimated quantities for surge capacity requirements beyond the initial immediate need.	• Ensure that cleaning and disinfection is conducted on any premises where a disease agent is presumed or confirmed to exist. This may be within 48 hours of disposal of depopulated animals, or in a time-frame as indicated by IC. • Remove, inactivate, reduce, or destroy pathogens at infected premises. • Cleaning and disinfection measures should focus on eliminating the virus in the most cost effective way possible.

Table B-1. Selected Preparedness and Response Goals

Critical activity	Preparedness goals	Response goals
Vaccination	• Determine if an effective vaccine is available for the FAD agent. Enter into vaccine bank relationships and/or establish logistics contracts (such as those through the National Veterinary Stockpile or other contracting mechanism) to maximize preparedness potential in a strategically sound approach that is cost effective. • Work with stakeholders to identify the situations or scenarios where strategic vaccination for an FAD will be requested. • Develop contingency plans for emergency vaccination, and exercise those plans; identify resources and requirements to effectively implement plans.	• If a decision is made to use an emergency vaccination strategy, then order the resources to implement the emergency vaccination strategy as rapidly as possible. • Engage in a public awareness campaign to provide information and education regarding the use of vaccination for the emergency outbreak.
Logistics	• Develop plans and processes for emergency contracting support for FAD response, for activities including transport, cold-chain storage, depopulation, disposal, and disinfection. • Provide extraordinary or rapid transport as required for sample collection and delivery to the National Veterinary Services Laboratories.	• Deliver the amount of requested vaccine or equipment to respond appropriately within 24 hours of an outbreak. • Provide emergency contracting support as needed for activities including equipment transport, cold-chain storage, depopulation, disposal, and disinfection.
Wildlife Management and Vector Control	• Identify risk factors for FAD transmission between wildlife and susceptible livestock for high-priority disease agents. • Develop the capabilities, in coordination with agencies with primary jurisdiction over wildlife, to rapidly develop wildlife management plans and procedures in an FAD incident.	• Conduct an assessment of the risk that wildlife poses for further transmission of the FAD to susceptible livestock within 7 days of confirmation of the FAD. • Develop a wildlife management plan rapidly after an assessment has been conducted. • Integrate wildlife management and vector control authorities and personnel into the Incident Command as required by the situation. • Prevent the spread of an FAD from domestic livestock to wildlife by controlling potential biological and mechanical vectors.
Animal Welfare	• Identify the resources and training necessary to provide humane treatment to animals during FAD outbreaks, particularly from the time they are identified for destruction or vaccination activities until they are depopulated, euthanized, or slaughtered.	• Provide humane treatment to animals given the outbreak circumstances, especially from the time they are identified for destruction or vaccination activities until they are depopulated, euthanized or slaughtered, as prescribed by veterinary authorities of affected States or Tribal Nations.

Table B-1. Selected Preparedness and Response Goals

Critical activity	Preparedness goals	Response goals
Modeling and Assessment Tools	• Develop, evaluate, and use quantitative tools to prepare for an animal disease incident. These tools can be used for things including contingency planning, training, assessment of threats, evaluating control strategies, designing surveillance programs, prioritizing interventions, and supporting resource allocation. • Develop proactive and commodity specific risk assessments that support continuity of business in the event of an outbreak.	• Provide scientifically supported modeling products and qualitative or quantitative risk assessments to address issues of concern with 72 hours after a request from the Incident Commander. • Use models and assessment tools in after action reports and/or lessons learned documents to analyze incident response as needed.
Appraisal and Compensation	• Pre-identify and train compensation specialists before the incident. Provide just-in-time training for compensation specialists as needed. • Exercise, evaluate, and improve administrative processes for performing appraisals and compensation functions before an outbreak.	• Data required for appraisal should be collected before depopulation. • Every attempt should be made to provide fair market appraisal prior to depopulation, in some emergency situations, appraisals will not be required to be signed prior to depopulation if there is immediate risk of virus spread or amplification of the virus on a presumptive or confirmed positive premises. • Timelines may vary depending on the species and types of animals.
Finance	• Develop templates for cooperative agreements with States and Tribes before FAD outbreaks. • Develop templates and processes to rapidly submit contingency fund requests, Commodity Credit Corporation requests, and supplemental appropriation requests.	• Rapidly request funds through appropriate funding mechanisms. Rapidly provide general and detailed budget information as anticipated and requested. • Provide timely finance functions within the Incident Command System (ICS) structure.
Incident Management	• Ensure that there is training available for personnel on the ICS from an introductory to an advanced level. • Develop plans and procedures for establishing an Incident Command rapidly in an FAD outbreak. • Develop processes to augment Incident Management Teams as indicated by the incident; identify resources, expertise, and/or personnel for this capability.	• Stand-up an IC and an Incident Coordination Group as quickly as possible (within the first 24 hours) after the detection of an FAD or foreign animal pest threat in the United States.

Appendix C
Glossary

Animal product	Blood or any of its components, bones, bristles, feathers, flesh, offal, skins, and any by product containing any of those components that originated from an animal or bird.
Biosecurity	A series of management practices designed to prevent the introduction and spread of disease agents on an animal production facility. This may include measures to contain disease (biocontainment) and also prevent the introduction of disease (bioexclusion).
Case	Any individual animal infected by a foreign animal disease, with or without clinical signs.
Compartment (compartmentalization)	An animal subpopulation contained in one or more establishments under a common biosecurity management system with a distinct health status with respect to a specific disease or specific diseases for which required surveillance, control, and biosecurity measures have been applied for the purpose of international trade.
Control Area	A Control Area (an Infected Zone and Buffer Zone) has individual premises quarantine for Infected Premises, Suspect Premises, and Contact Premises and movement restrictions for At-Risk Premises and Monitored Premises.
Emergency vaccination	A disease control strategy using the immunization of susceptible animals through the administration of a vaccine comprising antigens appropriate to the disease to be controlled.
Etiology	The causes or origin of disease, or the factors that produce or predispose toward a certain disease or disorder.
Euthanasia	The humane destruction of an animal accomplished by a method that produces rapid unconsciousness and subsequent death with a minimum of pain or distress or a method that utilizes anesthesia produced by an agent that causes painless loss of consciousness and subsequent death.
Foreign animal disease (FAD)	A transboundary animal disease not known to exist in the U.S. animal population.

Foreign Animal Disease Preparedness and Response Plan (FAD PReP)	Documents used to identify veterinary functions and countermeasures necessary to contain and control an FAD outbreak. It is also used to integrate functions and countermeasures with emergency management systems and operations conducted in Unified Command by local, State, and Federal personnel.
Fomites	Inanimate objects that can transmit infectious agents from one animal or person to another.
Incident Command System	A standardized, on-scene, all-hazards incident management approach that ◆ allows for the integration of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure; ◆ enables a coordinated response among various jurisdictions and functional agencies, both public and private; and ◆ establishes common processes for planning and managing resources.
Incubation period	The incubation period is the longest period which elapses between the introduction of the pathogen into the animal and the occurrence of the first clinical signs of the disease.
Index case	The first or original case identified in a disease outbreak.
Kill	Any procedure which causes the death of an animal.
Mass depopulation	Method by which large numbers of animals must be destroyed quickly and efficiently with as much consideration given to the welfare of the animals as practicable, but where the circumstances and tasks facing those doing the depopulation are understood to be extenuating.
Modified stamping-out	Animal health measures for stamping out that are not implemented in full.
Memorandum/ Memoranda of understanding	A document describing a bilateral or multilateral agreement between parties. It expresses a scope of activities and expectations between parties, indicating an intended common line of action or communication. It does not indicate a financial commitment.
National Animal Health Laboratory Network (NAHLN)	NAHLN is a cooperative effort between two USDA agencies and the American Association of Veterinary Laboratory Diagnosticians. It is a national network of State and University laboratories, which use common testing methods and software platforms to perform diagnostics and share information.
Non-contagious disease agent	A non-contagious disease agent is one that is spread by some means other than contact with infected animals or contaminated fomites.

Non-susceptible animal	Animal that does not develop a particular disease when exposed to the causative infectious agent of that disease.
World Organization for Animal Health (OIE)	Organization that collects and publishes information on animal diseases from 180 (2015) countries and develops standards for animal health.
Outbreak	The occurrence of cases of a disease that are in excess of what is normally expected in a given population.
Personal protective equipment	Clothing and equipment to prevent occupational injuries and diseases through control of exposure to potential hazards in the work place after engineering and administrative controls have been implemented to the fullest extent.
Preemptive slaughter	Depopulation under the competent authority of susceptible animal species in herds or flocks on premises that have been exposed to infection by direct animal-to-animal contact or by indirect contact of a kind likely to cause the transmission of the FAD prior to the expression of clinical signs.
Premises	A geographically and epidemiologically defined location, including a ranch, farm, stable, or other establishment.
Regionalization (also known as zoning)	An animal subpopulation defined primarily on a geographical basis (using natural, artificial, or legal boundaries).
Slaughter	The killing of an animal or animals for food, often by bleeding.
Stamping-out (OIE definition)	Means a policy designed to eliminate an outbreak by carrying out under the authority of the Veterinary Authority the following: a. the killing of the animals which are affected and those suspected of being affected in the herd and, where appropriate, those in other herds which have been exposed to infection by direct animal to animal contact, or by indirect contact with the causal pathogen; this includes all susceptible animals, vaccinated or unvaccinated, on infected establishments; animals should be killed in accordance with Chapter 7.6; b. the destruction of their carcasses by rendering, burning or burial, or by any other method described in Chapter 4.12; c. the cleansing and disinfection of establishments through procedures defined in Chapter 4.13.
Susceptible animal	Any animal that can be infected with and replicate the disease pathogen of concern.
Susceptible species	See susceptible animal.
Trace-back	The identification of the origin and movements of all animals, animal products, possible fomites, people, possible vectors, and so on that have entered onto an IP.

Trace-forward	The tracing of all animals, people, fomites, and so on that have left an IP. The premises that received the animals or goods should be investigated and kept under surveillance or quarantine.
Vector	An insect or any living carrier that transports an infectious agent from an infected individual to a susceptible individual or its food or immediate surroundings.
Zoonotic	Any disease or infection that is naturally transmissible from animals to humans.

Appendix D
Abbreviations

AHS	African horse sickness
APHIS	Animal and Plant Health Inspection Service
ARP	At-Risk Premises
BSE	bovine spongiform encephalopathy
BZ	Buffer Zone
CA	Control Area
CBPP	contagious bovine pleuropneumonia
CCHF	Crimean Congo hemorrhagic fever
CEAH	Center for Epidemiology and Animal Health
CP	Contact Premises
CSF	classical swine fever
CVO	Chief Veterinary Officer
CVZ	Containment Vaccination Zone
DA	Deputy Administrator
DIVA	differentiate between infected and vaccinated animals
EMRS	Emergency Management Response System
FA	Free Area
FAD	foreign animal disease
FAD PReP	Foreign Animal Disease Preparedness and Response Plan
FMD	foot-and-mouth disease
FP	Free Premises
FSIS	Food Safety and Inspection Service
HPAI	highly pathogenic avian influenza
IC	Incident Command
ICP	Incident Command Post
ICS	Incident Command System
IMT	Incident Management Team
IP	Infected Premises

IZ	Infected Zone
MP	Monitored Premises
NAHEMS	National Animal Health Emergency Management System
NAHLN	National Animal Health Laboratory Network
NASS	National Agricultural Statistics Service
ND	Newcastle disease
NIMS	National Incident Management System
NVSL	National Veterinary Services Laboratories
OIE	World Organization for Animal Health
PPE	personal protective equipment
PPR	peste des petits ruminants
PVZ	Protection Vaccination Zone
SAHO	State Animal Health Official
SOP	standard operating procedure
SP	Suspect Premises
SZ	Surveillance Zone
TDD	telecommunications device for the deaf
USDA	U.S. Department of Agriculture
VP	Vaccinated Premises
VS	Veterinary Services
VZ	Vaccination Zone

Appendix E
Selected References and Resources

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