



Preparedness and response planning for foreign animal disease (FAD) incidents is crucial to protect animal health, public health, the environment and to stabilize animal agriculture, the food supply, and the economy. This document provides a brief overview of the Animal and Plant Health Inspection Service (APHIS) FAD Framework: Response Strategies (FAD Preparedness and Response Plan [FAD PReP] Manual 2-0). It is intended to be an easy to use reference for responders at all levels.

### Goals of an FAD Response

There are three APHIS goals of an FAD response: 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, the economy, and to 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 goals will allow individual livestock facilities, States, Tribes, regions, and industries to resume normal production as quickly as possible. They will also allow the United States to regain disease-free status without the response effort causing more disruption and damage than the disease outbreak itself.

### Three Epidemiological Principles of Response

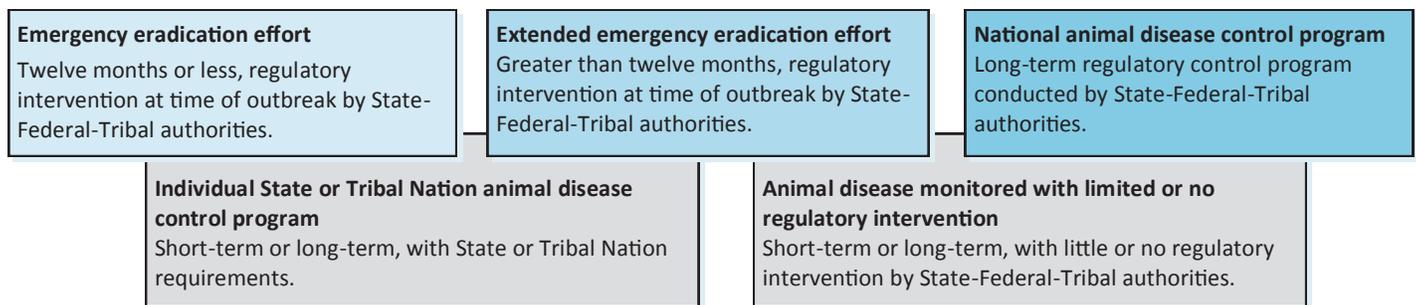
Three key epidemiological principles form the foundation of any FAD response:

1. Prevent contact between the disease and susceptible animals.
2. Stop the production of the FAD agent in infected or exposed 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.

### Regulatory Intervention during an FAD Outbreak

An FAD outbreak in the United States may result in emergency regulatory intervention by States, Tribal Nations, and/or Federal authorities. The USDA and the affected States and Tribes will work together in a Unified Incident Command, per the National Incident Management System, to detect, control, and contain the disease as expeditiously as possible.

#### Examples of State-Federal-Tribal Emergency Regulatory Interventions for an FAD Outbreak



#### Regulatory Scope

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
- ◆ Consequences of the FAD outbreak
- ◆ Response policy acceptance
- ◆ Scale of the outbreak
- ◆ Rate of outbreak spread
- ◆ Veterinary countermeasures available
- ◆ Resources available to implement response strategies
- ◆ Domestic animal disease management capabilities
- ◆ Wildlife management capabilities.

#### Authorization & Management

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

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. For further information on unified State-Federal-Tribal-stakeholder response can be found in the APHIS FAD Framework: Roles and Coordination (FAD PReP Manual 1-0).



**Transmission Characteristics of FAD Agents**

An animal disease is either contagious, meaning it is transmitted through animal-animal contact or fomite-animal contact, or not contagious, meaning it is transmitted by another means (for example, an arthropod vector). Contagious diseases can be classified as highly contagious or not highly contagious, depending on how rapidly the disease agent can move from animal to animal and farm to farm. Highly contagious diseases will require a rapid and coordinated response to control and eliminate the agent.

**Terrestrial FAD Threats**

The following table identifies terrestrial FADs that pose a risk to the United States. This list includes diseases most likely to occur, it is not all-inclusive and does not contain all potential terrestrial FAD threats.

FAD	Primary type of animal affected	Highly contagious disease	Vector-borne disease	Zoonotic disease potential
<b>Diseases with FAD PRoP Response Plans (Red Books)</b>				
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
<b>Diseases with FAD PRoP Disease Response Strategies</b>				
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
<b>Diseases with VS Response Materials</b>				
Contagious equine metritis	Equine	No	No	No
Equine piroplasmiasis	Equine	No	Yes	No
Schmallenberg virus	Bovine, caprine, ovine	No	Yes	No
Vesicular stomatitis virus	Equine, bovine, swine, ovine, caprine	No	Yes	Yes, rare
<b>Other FAD Threats (Alphabetical Order)</b>				
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 ( <i>Ehrlichia ruminantium</i> )	Bovine, ovine, caprine, other ruminants	No	Yes	No
Lumpy skin disease	Bovine	No	Yes	No
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. <i>Oryctolagus cuniculus</i> )	Yes	No	No
Sheep pox, goat pox	Ovine, caprine	Yes	No	No
Surra ( <i>Trypanosoma evansi</i> )	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



**FAD Pest Threats**

The following table identifies FADs introduced by pests that may pose a risk to the United States. This list is not all inclusive and does not contain all potential pest threats.

Foreign pest common name	Foreign pest scientific name	Primary type of animal affected	Disease transmitted; condition caused	Zoonotic disease potential
<b>Foreign Animal Pest Threats with FAD PReP Disease Response Strategies</b>				
Screwworm—New World	<i>Cochliomyia hominivorax</i>	Warm-blooded animals	Myiasis	Myiasis
<b>VS Control Program Exists</b>				
Cattle fever tick	<i>Rhipicephalus annulatus</i> (formerly <i>Boophilus annulatus</i> )	Bovine, ovine, caprine, other species	Bovine babesiosis	No
Southern cattle tick	<i>Rhipicephalus microplus</i> (formerly <i>Boophilus microplus</i> )	Bovine, ovine, caprine, other species	Bovine babesiosis	No
<b>Other Foreign Animal Pest Threats (Alphabetical Order by Pest Scientific Name)</b>				
Bont tick	<i>Amblyomma hebraeum</i>	Bovine, reptiles, other species	Heartwater	African tick-bite fever Tick typhus
Tropical bont tick	<i>Amblyomma variegatum</i>	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	<i>Chrysomya bezziana</i>	Warm-blooded animals	Myiasis	Myiasis
Louse fly	<i>Hippobosca longipennis</i>	Canine, livestock, other species	Bite only	Bite only
European castor bean tick	<i>Ixodes ricinus</i>	Bovine, ovine, caprine, other species	Bovine babesiosis	CCHF Lyme disease Bovine babesiosis (splenectomized population)
Licking fly	<i>Musca vitripennis</i>	Bovine	Bovine filariosis	No
Sheep scab, sheep mange	<i>Psoroptes ovis</i>	Bovine, ovine, other species	Mange	No
Brown ear tick	<i>Rhipicephalus appendiculatus</i>	Bovine, ovine, caprine, other species	East Coast fever Nairobi sheep disease	Tick typhus
<p>Note: Myiasis = fly larvae feeding on the host living tissue; mange = hair loss, itching, and inflammation from mite infestation; African tick-bite fever = <i>Rickettsia africae</i> (human disease); tick typhus = <i>Rickettsia conorii</i> (human disease).</p>				

**Critical Activities**

Critical activities and tools must be implemented to execute and support any response strategy. These activities and tools must support a science- and risk-based approach that protects public health, animal health, the environment, and stabilizes animal agriculture and the economy. Some of the critical activities that will be employed are as follows:

- ◆ Public communication and messaging
- ◆ Rapid appraisal and indemnity process
- ◆ Swift imposition of quarantine and movement controls
- ◆ Rapid diagnosis and reporting
- ◆ Epidemiological investigation and tracing
- ◆ Increased surveillance
- ◆ Continuity of business plans
- ◆ Biosecurity measures
- ◆ Mass depopulation and euthanasia (as response strategy indicates)
- ◆ Effective and appropriate disposal procedures
- ◆ Cleaning and disinfection/virus elimination
- ◆ Emergency vaccination (as response strategy indicates).

## FAD Investigations

The objectives of FAD and emerging disease investigations are to provide a veterinary medical assessment, rapidly provide presumptive and confirmatory diagnostic testing results, and ensure that the appropriate veterinary medical countermeasures, regulatory actions, and communications are recommended and implemented. The APHIS policies and procedures for FAD investigations are defined in the *FAD Investigation Manual* (FAD PReP Manual 4-0) and the *Veterinary Services Guidance Document 12001*.

## Response Strategies

Traditionally, there are five strategies for the control and eradication of highly contagious FADs in domestic livestock and poultry following an outbreak, however these don't always mean the same thing to all stakeholders. To avoid miscommunication, here are the definitions and descriptions of the response strategies that are used in the FAD PReP documents.

### Stamping-Out

Depopulation of clinically affected and in-contact susceptible animals.

*This has been a commonly used approach in 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 virus is unlikely.*

### 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 vaccinated animals may be delayed until logistically feasible, as determined by Incident Command and the VS Deputy Administrator (U.S. CVO).

*This is a suppressive emergency vaccination strategy, where the goal is to suppress virus replication in high-risk animals by using emergency vaccination and then depopulating vaccinates at a later date. This is the targeted vaccination of high-risk susceptible animals.*

### Stamping-Out Modified with Emergency Vaccination to Slaughter

Depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, with 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.

*This is a suppressive emergency vaccination strategy, where the goal is to suppress virus replication in high-risk susceptible animals by using emergency vaccination and then slaughtering vaccinates at a later date. This is the targeted vaccination of high-risk susceptible animals.*

### 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 of vaccinated animals. Vaccinated animals intended for breeding, slaughter, or other purposes live out their useful lives.

*This is a protective emergency vaccination strategy, where 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. This is a targeted vaccination of non-infected animals, and may include the vaccination of valuable genetic stock, long-lived production animals, or areas with a high-population density.*

### Emergency vaccination to live without stamping-out

Vaccination used without depopulation of infected animals or subsequent depopulation or slaughter of vaccinated animals.

*This is a protective emergency vaccination strategy, where the goal is to protect susceptible animals. This strategy is reserved for an FAD outbreak which is widely disseminated across the United States.*

## FAD Response and Vaccination Strategies

### Emergency 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, mentioned above. 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. If an appropriate vaccine is available, the use of emergency vaccination will be determined by the Incident Command, the State Animal Health Official, and the Veterinary Services Deputy Administrator (U.S. CVO).



### FAD Management

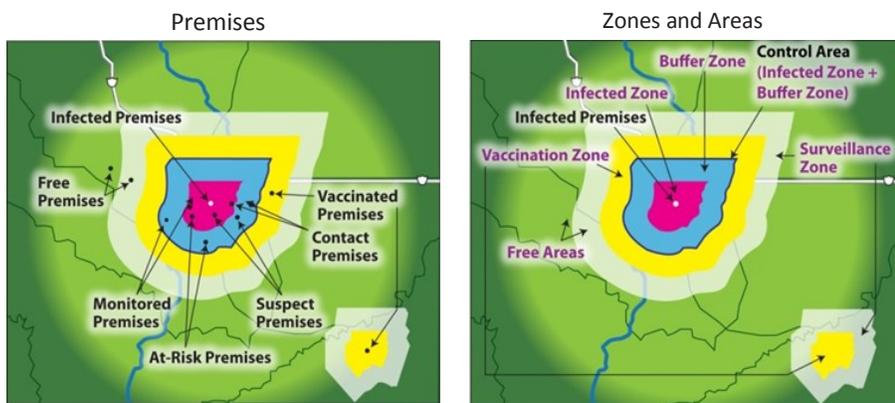
In some cases, such as when the disease agent is already widespread prior to detection and when a large number of animals are involved, *and* when no effective vaccine is available in appropriate quantities, the decision may be made to manage the outbreak without widespread stamping-out or vaccination. This approach may result in the United States being endemic for an extended period of time.

## Designating Zones and Premises

Establishment of zones, area, and premises designations is essential for FAD response efforts. In general, an FAD outbreak response involves 6 types of zones/areas and 7 types of premises, as seen below, and detailed in the *Response Strategies* document.

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

### Example Zones, Areas, and Premises



Note: Figures are not to scale. The Vaccination Zone can be either a Protection Vaccination Zone or Containment Vaccination Zone.

- ◆ Once zones and areas are established, quarantine and movement controls are implemented by the Unified Incident Command. These science- and risk-based measures help to control and contain the outbreak.
- ◆ Please refer to the *FAD Response Ready Reference Guide—Zones, Areas, and Premises in an FAD Outbreak* for more information on the minimum sizes of zones and areas.

## Recognition of Disease-Free Status

The World Organization for Animal Health (OIE) recognizes official disease statuses for member countries for FMD, CBPP, bovine spongiform encephalopathy (BSE), AHS, CSF, and PPR. An agreement between the World Trade Organization and the OIE gives the OIE a mandate to recognize disease-free areas, pest-free areas, and/or risk status for trade purposes. Any member that wishes to be included in the list of designated disease-status countries or to change its status sends a request to the OIE Scientific and Technical Department, accompanied by specific documentation and the relevant questionnaires for the disease. The Director General then submits the request to the Scientific Commission for evaluation. For example, the OIE categories for official country recognition for FMD virus are (*Terrestrial Animal Health Code*, 2015):

- ◆ 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).

For diseases other than AHS, BSE, CBPP, CSF, FMD, and PPR, Member countries can self-declare their entire country, zone, or compartment disease-free by providing relevant epidemiological evidence that requirements for disease status have been met in accordance with OIE standards.