Secure Zoo Strategy

Foreign Animal Disease Preparedness for the Exotic Animal Industry

This document is designed to provide guidance on Foreign Animal Disease (FAD) preparedness using a 10 Step process. These recommendations help you in the planning process, which can then be adapted into plans. This document includes:

- *10 separate sections, or steps, each focused a different aspect of FAD plan development. Each section will provide helpful information and references to guide the user through understanding the actions needed to accomplish that Step.*
- *A list of key tasks to accomplish before moving on to the next Step. Suggested elements are included, but may not apply to every facility. The planning process will determine what elements apply to you!*
- *Work sheets or check lists that provide the user a way to capture information that would be useful during the planning and response phases, provided where appropriate.*
- *Additional resources. It is recommended that a planning team read and understand the basics in these materials prior to undertaking Step development as it is highly likely that additional resources will be needed to develop a sound plan.*

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Introduction

Why Plan for Foreign Animal Diseases?

Foreign Animal Diseases (FADs)[1] are a special classification of infectious diseases or pests not normally found in the United States, though they may be found with some frequency in other parts of the world. FADs are a huge threat to the US economy, as they are generally highly contagious and are often difficult and very expensive to eradicate; in some cases, they may even have the ability to infect humans, making them a public health concern. These disease agents are sometimes referred to as **Transboundary Diseases**, because they often require coordination of nations to address response strategies.

During a FAD outbreak, the United States Department of Agriculture (USDA) and **State Animal Health Officials (SAHO)** will have authority. Even if your facility is not infected, your daily operations will still most certainly change during a FAD event. This is especially true the closer your facility is to one where a FAD has been identified. Authorities may require your facility to suspend movements of animals or biological materials, close to the public, or send samples for testing. In an extreme event, officials would even have the authority to depopulate susceptible species in your collection. This is why it is critical that we plan ahead.

In any FAD outbreak, the strategies authorities use to respond will change as more infections are detected and response agencies begin to understand the scale and scope of what they are facing. The time to think about planning is not when a disease is detected.

Guidelines, such as the Red Books and **National Animal Health Emergency Management System (NAHEMS)** guide books, have been developed to protect the animal agriculture industry. Though your animals are not considered part of the "food chain," we are still bound by many of the same strategies that would be put into place to manage disease within food chain animals. It behooves us as an industry to learn more about this "playing field" of response tactics. You'll be introduced to these guidance documents during the planning process.

Get Started Building Your Facility Plan

As a member of the **Exotic Animal Industry (EAI)**, you will find that there is no "one plan fits all," as there is a great deal of diversity across facilities and business models in the industry. For example, municipality zoos have several differences when compared to a game ranch, even though both are

[1] The World Organization for Animal Health (OIE) maintains a full list of FAD agents that can be found on their website http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2018/

considered part of the EAI. This document will move through the planning process step by step to help you, as a facility operator/owner, begin to take steps in developing a plan. This planning process is intended to help you meet your facility's specific needs and the regulatory requirements that may be imposed by officials during a Foreign Animal Disease (FAD) outbreak.

Secure Zoo Strategy (SZS) is an effort to help the Exotic Animal Industry facility operator craft a facility-specific plan, much like the food animal production farm owners are doing with similar planning aids – **Secure Food Supply Plans**. Each food animal production sector has a Secure Plan (Secure Pork, Secure Milk, Secure Beef, and Secure Egg). These plans provide strategies that are critical to State and Federal Animal Health Officials (SAHOs), as they represent industry-led business continuity planning that will help protect animals, farms/facilities, and owners. Secure Zoo Strategy uses and advances previous work accomplished on behalf of the EAI to advance the goals of preservation, animal movements, and visitation. As you plan to protect your EAI facility, take confidence in knowing that you are using consistent terminology and strategies used in other Secure Plans[2].

Planning for disease events is best accomplished using similar steps as all-hazards contingency planning. The regulatory issues with Foreign Animal Diseases require special considerations. To get the most out of Secure Zoo Strategy, it is recommended that the planning team review contingency planning basics for the EAI. Narrated modules for all-hazards preparedness and an accompanying workbook are available on the ZAHP Fusion Center website (zahp.aza.org). These modules may also be viewed on the ZAHP YouTube channel. There are additional guidance documents for all-hazards planning available as pdfs on the ZAHP site, developed in 2010 by a Best Practice working group for the zoological community.

Three levels of planning information will be provided for your use in developing a disease preparedness plan. First is high level concept information, including who the players will be in a FAD outbreak, what the potential effects of the disease on a facility are, and what added protections facility personnel may have to initiate to protect animals from the disease. The next level of information is used for application, to prepare the facility to respond to the disease. The goal is for the facility's personnel to use this information to outline prevention and response *strategies*, with the help of the State Animal Health Officials (SAHOs). Finally, the third level of information includes research that will enable the planning team provide descriptions of the various protocols for response. The Secure Zoo Strategy's goal is to provide you with a path that allows any facility planning team to drill down into the different levels of information in a productive and, hopefully, time conserving manner.

[2] For more information about the Secure Food Supply Plans visit the Center for Food Security and Public Health Website http://www.cfsph.iastate.edu/Secure-Food-Supply/ .

Step One

Build Response Partnerships

As an Exotic Animal Industry (EAI) facility operator, the first step in developing your facility's response plan will be to understand that in a Foreign Animal Disease (FAD) outbreak, facilities with susceptible animals are subject to state and federal regulations, overseen by the State Animal Health Official (SAHO) in partnership with USDA officials. To build a successful partnership with the SAHO (USDA representatives in your State) these are the things you should consider:

- Set up a face-to-face meeting with your SAHO to discuss the Disease Response Planning process for your facility. The plan development process will take time, but you want to be sure you understand the resources available from the SAHO, and their authority to authorize their use. It is important to understand potential resources that may be provided and the initial approach they will take to disease response for your state.
- Discuss and provide information to the SAHO about your facility, such as types and number of animals, location (GPS/address) and facility lay out, and daily operations. If it is an available option, register your Facility in the SAHO database (usually you will be issued a **Premises ID number**).
    - Note: Ensure that your organization has an understanding of what data may be publically available by participation in this State program.
- Ask your SAHO what additional information you will need to provide should an outbreak occur involving either your facility or one near you. In the event of a disease outbreak, the SAHO may require information such as trace back and forward involving animals, personnel, and visitors that entered/exited the facility.
- Share the facility plan preparatory work with the SAHO in order to receive feedback and mutual understanding of your facility's plan.

Before we go into further detail about how you can begin building a relationship with your SAHO, here is information on what the time frame of a FAD response might look like, including restrictions that could impact your facility. This background information will help improve your understanding of how an outbreak could affect you, and why building a partnership with your SAHO beforehand is important.

FAD Response Background

Response Time Frame Guide

This section provides a general description of actions during each time frame of a response. These are intended to aid Exotic Animal Industry owners, operators, and representatives in creating response plans by giving them an idea of what to expect from a State and Local level.

Notification

Time Frame: *0 hours*

A veterinarian observes clinical signs of a potential FAD in animals they have been asked to examine and recognizes that proper officials should be consulted. A Federal or State Animal Health Official is notified that a potential health problem exists, beginning a Foreign Animal Disease (FAD) investigation and the official process of response. Such notifications can arise in a number of ways, but they generally begin with a facility reporting a situation to the State Animal Health Official/USDA or a lab submission/test revealing a possible problem, which is then reported to a health official.

Investigation

Time Frame: *0-12 hours*

Disease investigations officially begin when a SAHO determines that a site visit should occur. They assign a special investigator, known as a **Foreign Animal Disease Diagnostician (FADD)**, to visit the facility and evaluate the situation. The FADD's evaluation is based on presentation of the animal(s), signs of disease, and sampling/testing. **Quarantine** and recommendations for actions are issued if the investigation finds anything that looks suspicious or, if nothing is suspicious, the case will be closed.

The time between a FADD's on-scene evaluation and a FAD confirmation can vary depending on disease agent, case, location, environment, characterization/prioritization, and testing protocols. Generally, a facility should expect it to take anywhere from 6 hours to potentially days to get definitive results and confirmation. During this time, response officials may activate an Incident Management Team (IMT), a group of trained personnel that work on disease outbreaks, in order to have them ready in case of a confirmation of disease.

For some diseases, activities may be initiated before confirmation; especially if there have been previous detections. These activities are usually determined by the SAHO in consultation with USDA officials and their Incident Management Teams. Such activities may include restricting movements, increasing **biosecurity**, implementing quarantines, conducting **surveillance** on other facilities, ordering traces

backward/forward to determined who and what has entered and exited the facility, and/or implementing other protective measures to prevent disease spread. It is not likely that SAHOs will condemn/order **depopulation** of animals if the particular **FAD response plan** calls for such until confirmation. Notification schemes, public information (as needed and as warranted), and working with producers located near a potential outbreak are all things that may happen before confirmation, understanding that there are very significant economic and industry repercussions regarding market disruptions and trade problems if information is handled incorrectly.

Confirmation

Time Frame: *12 – 24 hours is the typical goal, but an unknown or novel/emerging outbreak could take much longer. Generally, confirmation could take anywhere from 6 hours to multiple weeks.*

Confirmation of a FAD will have to occur at either the Foreign Animal Disease Diagnostic Laboratory (FADDL) in Plum Island, NY or the National Veterinary Services Laboratories (NVSL) in Ames, Iowa. Once confirmation has occurred, state laboratories approved by USDA may perform testing for surveillance, etc. State labs usually have to rely on the federal labs (FADDL and NVSL) to determine the types of virus for diseases such as **Foot-and-Mouth Disease (FMD)** and **Highly Pathogenic Avian Influenza (HPAI)**.

Response

Time Frame: *Response is the time from confirmation until the disease is eradicated. If the disease cannot be eradicated, the disease response is re-categorized as an endemic disease management program. The length of time to respond depends upon the scale and the scope of the outbreak. The Response timeframe could be months, years, or, if the disease becomes established in wildlife populations, indefinite until re-categorized.*

Once confirmation has occurred, SAHOs have the authority to invoke condemnation and depopulation in an attempt to stop/limit the production and spread of the disease agent. If a Declaration of Emergency is made by State and/or Federal Officials, additional resources (especially those from other Agencies or States) that aid in response will be made available. Personnel, equipment, and supplies are included in support from Emergency Management, Law Enforcement, Public Health, Academic Institutions, Environmental Agencies, and the National Guard. In previous planning sessions, use of the Military in FAD response has not been approved due to mission and cost, however, National Guard troops would likely be used first if such resources are to be activated.

Depending on the size of the response expected, the SAHO will develop a response structure (Incident Management Team) to conduct disease eradication/management objectives. During a FAD outbreak, the authority needed for response is held at the State and Federal level. Thus, direction for response activities will be determined by the SAHO and/or USDA, and will be discussed and/or shared with local (County) levels to assure their support. Another thing to consider is that even though an **Infected**

Premises may only represent a small geographic area, whole animal industries will likely be impacted by a FAD outbreak and be involved in efforts to conduct surveillance and prevent spread; this will likely result in some level of response activities taking place in county/parish jurisdictions that do not have the disease. Response structure activation on State and Local Level may include the following:

- **Emergency Operations Centers (EOC):** These are facilities that typically house large numbers of agencies in a collaborative setting to form a larger response group, formally organized under the **Incident Command System (ICS)** as directed by the National Incident Management System (NIMS). The value of using ICS to manage disease outbreaks is that other states will be using the same system, which standardizes positions, language, and reporting. ICS is the large event management system used by Fire and Emergency Management groups nationwide. By using ICS when responding to agricultural events, Agricultural response gains the opportunity to utilize other stakeholder group's personnel and expertise as surge capacity.
- **Policy Group:** This group consists of Agency Personnel/Officials who will determine strategy and policy for the response. Their decisions will become the authority and direction for the designated Incident Management Team. The SAHO and USDA will either be in the Policy Group or have representatives designated to create policy on their behalf. The Policy Group will utilize existing regulations and policy already created for known FAD agents (eg, USDA's Red Book) but there may be a need to make decisions regarding options within existing policy. For emerging disease situations where the disease agent has previously been unknown, or where there has not been policy developed, the Policy Group will create the policies needed for the Incident Management Team to enact.
- **Incident Management Team (IMT):** The **Incident Commander (IC)**, who is designated by the SAHO, will choose members of the IMT based on the specific challenges of the outbreak. The team will include representatives from government agencies, industry, and support organizations to provide the most formidable response possible.
- **Exotic Animal Industry Representation:** If the IC determines EAI representatives should participate in the response structure, positions could include the following:
    - **Public Information Officer (PIO)**
    - Liaison representative to the Incident Commander (IC)
    - Group Supervisor
    - Technical Specialists for the Exotic Animal Industry.

- **Designation of Geographical Zones and premise types:** One of the overarching critical elements of the response will be to designate **Response Zones**, which on a map show how close a neighboring facility is to an infected facility. Also, facilities/premises will be given designations, such as **At-Risk** or Suspicious, to show their relation to the infected premises. Zones and **premises designations** are standardized and have been used for various outbreaks in the past; they will be discussed in greater detail later in this step. These distinctions are used by Response Officials to lay out where specific protocols (such as biosecurity, surveillance, and

restricted movements) will be implemented. The closer to the outbreak a neighboring facility is, the more biosecurity, surveillance, and restrictions will be expected. Exotic Animal Industry facilities with susceptible animals will be expected to implement the protocols that correspond to their respective Zone designation. (Figures 1.1 and 1.2 provide a visual example of Zones)

- **Implementation of Response Protocols:** To accomplish containment and eradication of a FAD outbreak, premises with susceptible animals must comply with protocols implemented by response officials. These include, but are not limited to, the following:
    - **Biosecurity Protocols:** Increased measures/activities to prevent disease organisms from spreading from infected premises to other premises. Protocols may include restricted entry, use of decontamination for entry, and personal protective equipment (PPE), as well as concepts such as line of separation (LOS) to prevent disease entry. Guides and information developed by the SZS Biosecurity Working Group can be found in Step 5 of Secure Zoo Strategy, which is dedicated to helping facility operators develop strong biosecurity programs.
    - **Restrictions:** Once an outbreak occurs, usual business practices will need to be altered, or in some cases halted, due to the risk of such practices spreading disease. Animal and animal product movements, visitation by the public, and other such activities may be restricted for a time or allowed under permits, which would be issued by the IMT once a premises has implemented the required response protocols for the disease outbreak. Guidance and information on animal movement and visitation will be discussed in various Steps of the planning process.
    - **Surveillance:** Understanding the status (infected or not infected) of the premises in an outbreak area is crucial to addressing the disease, as well as allowing business continuity for unaffected premises. Exotic Animal Industry facilities will be expected to participate in surveillance protocols to continue activities such as visitation and animal movements in outbreak areas. A challenge that will have to be worked through by all response personnel and EAI facilities is that nearly all surveillance protocols in use have been developed primarily for food animal production facilities and may need to be adapted for exotic collections. Information to help EAI Facilities build surveillance protocols/programs can be found in Step 6 of the planning process.
    - **Other protocols:** Additional protocols may include vaccinations which would help protect susceptible animals. Many of the vaccines for FADs were created for domesticated livestock, so understanding how they may be used in EAI collections is an ongoing challenge.

Recovery

Time Frame: *Recovery begins even before eradication of the disease and may last long after the event!*

Recovery for any event should be part of the preparedness and response planning phases, a part of the response itself, and then continue after response as long as needed. Full recovery from a FAD outbreak

can take years to decades depending on the size, type, disease agent, and success of eradiation of an outbreak. Guidance for Recovery can be found in Step 9 of the planning process.

Zones and Premises Designations

Exotic Animal Industry (EAI) facilities that contain susceptible species in their collections can be impacted during Foreign Animal Disease (FAD) outbreaks even if the disease does not infect their facility. Restrictions put in place during an outbreak could be especially impactful; for example, a facility's proximity or relationship to an infected premises may require them to follow certain prescribed protocols. This document will introduce the concepts of FAD Response Zones and Premises Designations, using USDA response guidance to help facility owners and operators understand the actions they should take during an FAD outbreak. The Secure Zoo Strategy approach uses Zoning and Premises designations to outline the actions and guidance that Exotic Animal Facilities need to follow.

Response Zones

FAD Response Zones are based on geographic distance from an infected premise. In the event of an outbreak, facilities within these Zones will receive Premises Designations that describe their relationship to the infected premises, with regard to exposure and potential risk of being infected. Premises designations are critical, as they help facility owners and operators understand the level of biosecurity and surveillance measures that should be taken to protect their collections.

Figure 1.1, below, illustrates both zones and premises designations within the zones. The initial zoning would consist of an **Infected Zone**, which designates the area surrounding the infected premises with a radius up to 3 km., and a larger **Buffer Zone** that immediately surrounds the infected zone, extending an additional 7 km. The term **Control Area** describes the combined area of both the Infected Zone and Buffer Zone, with a total radius of 10 km from the infected premises. Each premises within the Control Area is given its own status and designation to help response personnel delineate which protocols would apply to a given premises; these designations will be discussed later in this document. The figures below can be used to help Exotic Animal Industry (EAI) facility owners and operators better understand how zones and premises designations would apply to their specific facility[3].

[3] Figures 1.1 and 1.2 can be viewed with supporting definitions at https://www.aphis.usda.gov/animal_health/emergency_management/downloads/hpai/hpai_zones.pdf

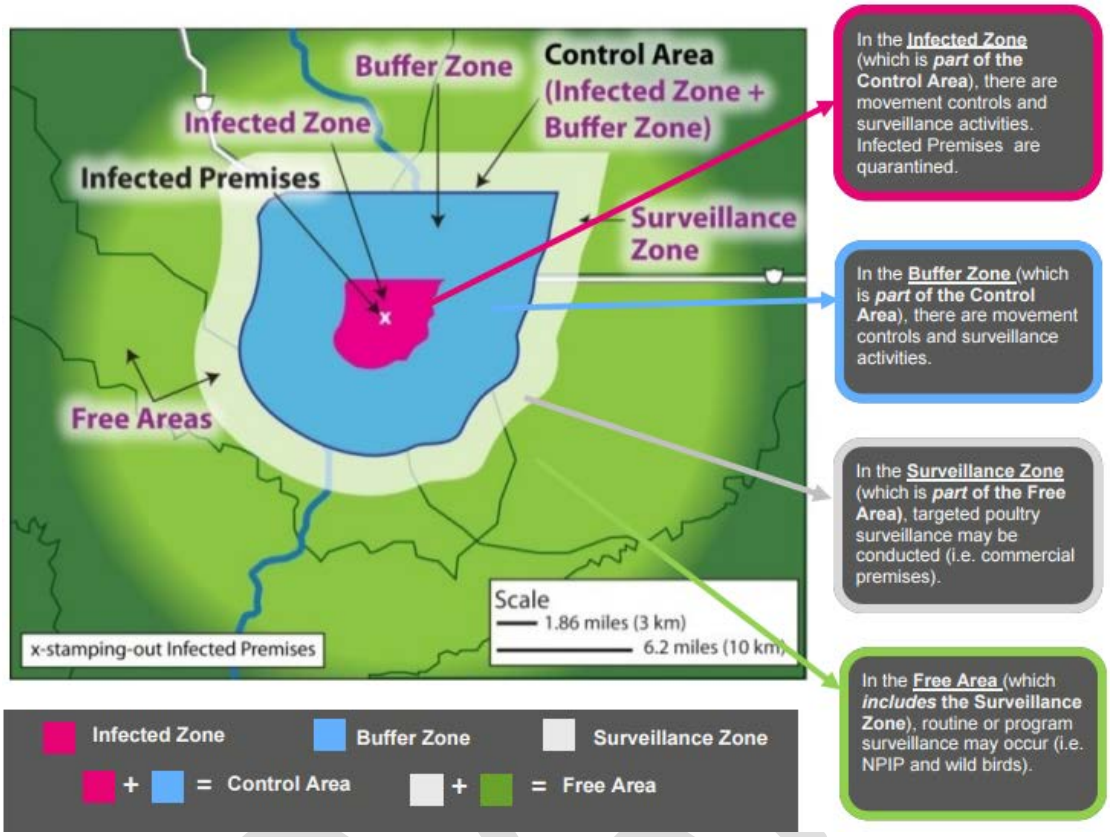

FIGURE 1.1: OVERVIEW OF ZONES (USDA APHIS Veterinary Services)

Note: The "shape" that a zone takes is based upon the distances described above, but may vary due to geographic features, such as roads and rivers, that are more "natural" boundaries for Zones.

Premises Designations

To aid response officials and facility owners and operators in understanding the protocols they should be implementing, premises within the Response Zones will be designated according to the descriptions below. A premises designation will change to reflect the status of the facility. For example, a facility may start as an At-Risk premises but, once biosecurity protocols and surveillance have reached an acceptable level, the facility may be changed to a **Monitored Premises**; this change in designations would allow that facility to conduct more business activities.

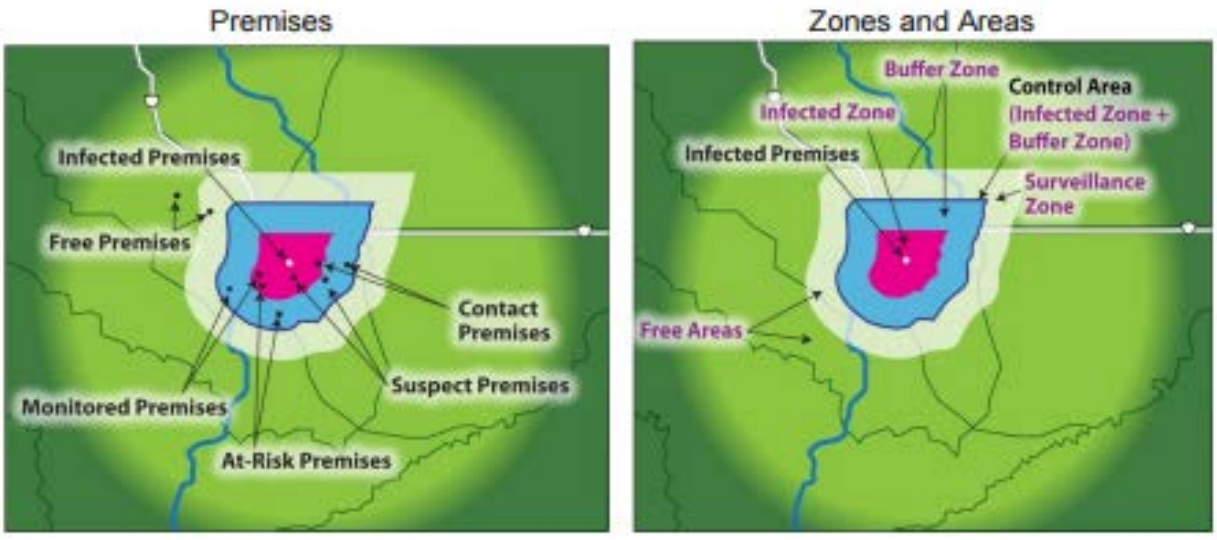

FIGURE 1.2: PREMISES DESIGNATIONS WITH ZONES AND AREAS (USDA APHIS Veterinary Services)

Infected Premises

Premises/facilities that *have disease agents present* will be designated as Infected Premises. In domestic agricultural species, eradication efforts, which may include depopulation of infected and exposed animals, would begin at premises with this designation.

For EAI facilities, many with animals that need to be preserved, understandings and agreements with SAHOs and **Federal Animal Health Officials (FAHOs)** should be reached *before* an outbreak. This allows for the development and implementation of plans that could factor in preservation of valuable species. Facilities where animal deaths occur, including those where non-conservation value species were depopulated, would need to properly dispose of carcasses. Decontamination of all facilities, down time, and environmental testing would need to occur before repopulation would be permitted. For EAI facilities utilizing disease management plans rather than depopulation, ongoing containment through biosecurity, surveillance, decontamination and other measures would continue until the disease agent had been cleared from the animals in the collection. Animal and environmental testing would be done to confirm that the disease was no longer present. For conservation valued species where the disease agent could establish a carrier state, agreements between Federal/State Animal Health Officials and Facility Operators would need to be crafted to determine how those animals would be managed.

Contact Premises

Premises/facilities that have *some epidemiologic link to an Infected Premises* (e.g., shared equipment, movements of animals, personnel) will be designated as **Contact Premises**. The animals on Contact Premises are usually quarantined (highly restricted) and are tested regularly (often daily or every other day) until enough time has passed that response officials can be confident that the disease agent is not present – generally at least one incubation period.

Once a Contact Premises testing is negative over a defined period, it becomes an At Risk Premises and follows those protocols. For facilities designated as Contact Premises, surveillance protocols will need to be developed. Testing will need to be accomplished in the necessary time frame for the susceptible populations in the collection. This may present unique challenges to EAI facility operators depending on the species of susceptible animals are and how they are managed. Creative surveillance methods may need to be developed. To help the process, it is recommended that facility operators work with SAHOs to have these methods approved before an outbreak. Surveillance will be discussed further in Step 6.

In addition to surveillance challenges, Contact Premises will likely have public visitation severely restricted, as a common measure to prevent disease spread is to quarantine the facility from all non-essential visitors. Because of this, it is highly recommended that facilities include business continuity considerations in their contingency plans. Depending on the disease agent and the activity in the Control Area, a Contact Premises designation could be in place for weeks and could pose significant business and management challenges for an EAI facility. It is important to think about these types of revenue implications during the planning process.

Suspect Premises

Premises/facilities that have animals *showing suspicious signs* representative of the disease agent involved in the outbreak will be designated as **Suspect Premises**. Suspect Premises will undergo quarantine and testing to determine if disease is present. If the disease is not present, the Suspect Premises will revert to an At-Risk Premises status and follow those protocols. The designation of Suspect Premises usually lasts only the time required to determine if the disease agent is present.

At-Risk Premises

Most of the premises/facilities in the Control Area will be designated as At-Risk Premises because they are *near the infected premises*. These Premises will undergo increased biosecurity protocols, such as entrance protection and decontamination, to prevent entry of disease, and surveillance protocols to show that the premises continues to be uninfected.

Monitored Premises

Monitored Premises are *former At-Risk premises that have achieved the monitored status by virtue of completing additional surveillance tests and implementing strict biosecurity standards* allowing them the opportunity to engage in more business activities than At-Risk Premises. The goal is to ensure these facilities have taken and documented enhanced protective measures to ensure they are negative and thus can engage in activities such as animal movements and visitation. Facilities that need to move animals, or want to continue allowing visitors, would likely want to pursue becoming a Monitored Premises. This objective is something that should be discussed with SAHOs well before an outbreak, understanding that nearly all food animal production farms will not have visitation as one of their goals.

Building Response Partnerships for Your Facility

The first step in developing your facility's response plan is to understand that, in the event of a Foreign Animal Disease (FAD) outbreak, facilities with susceptible animals will be subject to state and federal regulations overseen by the State Animal Health Official (SAHO) in partnership with USDA officials. Many facility managers may have already met with and formed a working relationship with their SAHOs. For those who have not, Step 1 provides guidance to help ensure that the first meeting is productive for all parties. Some preliminary actions are for facility managers are to provide personnel with an understanding of their facility and how it fits into a state's FAD Response Plan. Facility managers just beginning the relationship-building process should consider working through Steps 2-4 before meeting their SAHO. Those who already have a working relationship with their SAHOs should use these same steps as a checkup to ensure all areas are fully considered.

It is highly recommended that facilities develop a planning team that includes a leader**, Biosecurity Manager** (which will be discussed in Step 5), veterinarian, curators, keepers, and other key employees so that the combined group has a complete understanding of your facility. In addition to allowing for varying opinions on strategies and tactics for plan development and implementation, having a number of individuals invested in planning reduces individual workload by spreading out responsibilities for the various parts of plan completion. There is no right way to form your team, and individuals are often added or consulted as needed. Additional guidance for the selection of the planning team can be found in Modules 1 & 2 of the ZAHP Fusion Center's Contingency Planning Modules: https://zahp.aza.org/contingency-planning/

Action Items

Prepare for a Meeting with your State Animal Health Official

Scheduling an in-person meeting with your SAHO to discuss the disease response planning process for your facility is a crucial step in building response partnerships for your facility. If you have never met with your SAHO, or have not previously included diseases in your planning process, it is recommended that you wait to schedule this meeting until you have worked through Step 4 so that you have defined your business model, started your risk assessment, and considered the roles various people would play in a response, and thus have a better understanding of and readiness to discuss FAD response concepts. The plan development process will take time, but you want to be sure you understand the authority of the SAHO, their initial approach to disease response for your state, and what potential resources may be provided. Please document expectations from your visit with SAHOs in your preparedness plan.

You should be prepared to provide your SAHO with the following information about your facility:

- Physical location (GPS/address)
- Types and number of animals

    - *Note: Your SAHO may have very limited knowledge of the susceptibility of your collection to various Foreign Animal Diseases.*
- Facility lay out (the mapping tool in Step 5 is a fantastic tool to share and work through with your SAHO) and daily operations.
- Other physical characteristics and operating procedures, as needed/requested.

Develop Partnerships

The development of partnerships is critical in FAD planning. Since SAHOs and the United States Department of Agriculture (USDA) are regulatory authorities that determine response strategies, it is beneficial to include them in planning. Consider the following to build partnerships:

- Register your Facility in the SAHO database and receive a Premises ID number. This option may not be available in all states.
- Explore existing FAD planning in your state and discuss with the SAHO. This is an important point of discussion between a facility and the SAHO at this early stage, as your facility plans will need to be compatible with the State's overall response planning for foreign animal diseases.
- It will be important to note if current State plans include any specific details for the EAI. Share the goals and objectives of your facility's disease plan with the SAHO. Additional information about goals and objectives for plans will appear in Step 2.

The SAHO will describe other types of information that may be required should an outbreak occur directly adjacent to, near, or involving your facility (review the FAD Response Zone and Premises Designation discussed earlier). Required information may include a detailed record of animals, personnel, and visitors that entered/exited the facility over a period of time (usually last two weeks). This information would be important in an outbreak investigation and thus, it is highly recommended that facilities that do not already have a process to record daily activities create one. These records should include a log of visitors (where practical), feed deliveries, vendor services, and of course animal movements into and out of the facility.

In your planning process, it is recommended that you share the work-in-progress with your SAHO to receive feedback and mutual understanding of your facility's plan. It is also recommended that meetings with your SAHO include a visit to your facility, during which you conduct a walk-through of your plan as well as a review of your facility map, which you will develop in Step 5. The walk-through meeting would most logically occur as part of Step 10, and utilize the materials and information you have compiled in this process.

Assessment

Now that you have read through Step 1, it is time to assess your progress.

The following assessment checklist includes a number of tasks that you have already begun or completed in your planning process. Use this assessment to track your progress, record any additional actions that your team is planning to take at each risk level, and take notes on what still needs to be done for Step 1 at your facility. Keep in mind, these actions may need to be revisited during an ongoing outbreak.

A final Assessment will be included in Step 10.

- ☐ Ensure that contact Lists for all employees, volunteers, etc. are current and review schedule is determined to keep updated.
- ☐ Determine which staff members should contribute to plan development.
- ☐ Review current capabilities of facility staff and describe any Facility Response Team that may have been designated or trained (there will be more on this in Step 4).
- ☐ Provide SAHO the names, phone numbers, and email addresses for designated contacts at the facility to convey information/answer questions, etc. At a minimum, this should include owner/operator and the facility's veterinarian. Preferably, it will include at least three individuals listed in order of authority to make decisions for the facility.
  See the "Facility Information worksheet" included at the end of this step.
- ☐ Maintain current notification list for vendors for communication and trace back.
- ☐ Discuss roles and responsibilities of other jurisdictions (agencies) in the event of a FAD. (This will vary tremendously from state-to-state, and incident-to-incident. However, explore perceived roles and responsibilities of other partners such as Emergency Management, appropriate Law Enforcement, etc.)
- ☐ Determine if exotic animal industry has been considered in State disease planning. Discuss the possibility of including an exotic animal industry response addendum to State FAD Response plans with your SAHO if not already considered
- ☐ Review the SAHO's triggers for FAD preparedness and response and develop facility-appropriate capabilities to meet preparedness levels.
- ☐ Devise and agree upon response objectives for FADs with SAHOs, both for if your facility is negative and in a Control Area, as well if the facility becomes infected.
- ☐ Begin sharing animal valuation (or any supporting documentation) with SAHOs to assist with planning and response. See Step 2 more information on valuation.
- ☐ Obtain a Premises ID number by contacting your SAHO (this may not be available in all states).
- ☐

Notes

Facility Information Worksheet

Facility Name: _____

Address: _____

Premise ID# (issued by SAHO): _____

Use this worksheet to provide pertinent information about your facility to your SAHO. In addition to the information below remember to include a map of your facility (you will have the opportunity to create a map in step 5).

Emergency Contact Information

Enter emergency contact information for your facility in the table below

Owner	
Name	
Address	
Phone	
Facility Contact 1	
Name	
Address	
Phone	
Facility Contact 2	
Name	
Address	
Phone	

Susceptible Animals

List the type & number of each susceptible species in your collection (e.g. Elephants (2)). This will require research to determine which species in your collection may be susceptible to various Foreign Animal Disease Agents[4]. Hit enter after typing the first species in the text box to move to a new line.

Disease	Species	Number
FMD		
Avian Influenza		

[4] The AAZV Infectious Disease Manual (2013) found at http://www.aazv.org/?754 and the European Association of Zoo and Wildlife Veterinarians (EAZWV) Transmissible Diseases Handbook found at https://eazwv.site-ym.com/page/inf_handbook?&hhsearchterms=%22infectious+and+disease+and+manual%22 are good resources for this task

Vendors and Feed Sources

Include a list of vendors and feed sources below, with contact information and a general description of goods/services they provide

Name	Contact	Goods/Services

Step Two

Understanding Your Facility's Business Model

The Exotic Animal Industry (EAI) encompasses a number of different business models, and any given facility may rely on one or more of the following components as a pillar of their business. These models may include:

- **Preservation**
  Practically all EAI facilities desire to preserve the animals in their collections, but some animals may be so valuable from a monetary or conservation perspective that they are part of enhanced preservation objectives. Your State Animal Health Official (SAHO) needs to be informed about the preservation plans and about those animals' relative value.
- **Movement**
  Some EAI facilities have the need/desire to move animals into or out of their facilities. Foreign Animal Disease outbreak response regulations often limit movements of susceptible animals as an attempt to control spread of disease. If your facility moves animals or their products, such as in game ranching, your SAHO will need to understand the types of animal movements (frequency, what animals, and where) that occur at your facility. In addition, there are specific actions your facility will need to take to allow those movements in a Foreign Animal Disease (FAD) outbreak.
- **Visitation**
  Other EAI facilities utilize visitation as a key component of their business model. If your facility relies on visitors in its model, your plan will need to address the increased risk associated with having visitation during an outbreak. Your SAHO will need to work with you to develop your biosecurity plan to account for this risk. Development of a biosecurity plan will be discussed further in Step 5.
- **Assisted Reproduction**
  This area is highly specialized science that is not practiced in all facilities; however, if your business model includes the use of assisted reproduction technologies, this should also be included in the planning process.

Guide to how SAHOs will Work with the Business Continuity Goals of the EAI

There are a number of considerations that would likely play a role in the decision by a SAHO to allow business continuity activities at an Exotic Animal Industry (EAI) facility during a FAD outbreak. The following discussion of SAHO's perspectives on EAI business continuity activities is presented to increase facility owners/operator's awareness of the associated regulatory concerns that may arise for SAHOs.

A distinctive difference between agricultural production (in most instances) and many exotic animal facilities is that zoos, aquariums, exhibits, etc., *rely* on visitors as a revenue generator. This is counter-intuitive to biosecurity protocols in food animal production agriculture, which is a production system that does not rely on revenue from guests and is often very closed off to visitors. Considerations for visitation are included throughout SZ guidance documents, and rely heavily on the development of biosecurity. Depending on the SAHO's perception of the effectiveness of biosecurity protocols such as **Lines of Separation (LOS)**, the following may also be required:

- Surveillance that provides daily/running proof of negative status
- Vaccination or other measures that provides enhanced immune protection
- Visitor education and restricted travel to affected areas policy

Risk-Reduction Protocols

There are a number of protocols/actions that EAI facilities have as options to further secure and mitigate/reduce risk to their facilities. These concepts will be explained as your facility works through the steps of Secure Zoo:

- **Biosecurity Protocols:**
    - **Conceptual**- Understanding the risk of disease outbreak based on location of the facility (for example: is the facility located next to a feedlot or isolated in a city park?)
    - **Structural** – Creating LOS based on facility layout that help prevent exposure of animals to disease agents (ex: walls)
    - **Operational** – Creating protocols to prevent the introduction and spread of pathogens such as entrance/exit protocols and cleaning and disinfection
- **Surveillance Protocols:** The ability of an EAI facility to provide surveillance information to the SAHO will certainly either help the SAHO feel more or less confident of the facilities current status whether negative or positive or unknown. Surveillance is discussed in Step 6 to help EAI facility operators and SAHO's craft reasonable, effective and facility specific surveillance plans.

- **Vaccination/Immune Enhancement Options:** The value of effective vaccine programs that help protect susceptible animals provides SAHO more confidence that activities such as animal movements and visitation can occur with less risk as the animals can better fend off small exposures of disease agents. It must be remembered thought that no vaccine can be expected to protect animals if overwhelming amounts of disease agents are present. Thus, vaccine programs are a tool that, in conjunction with the other programs effectively in play, can help SAHOs in their decisions. The exception would be the situation where trading partners would refuse imports due to animals being vaccinated.
    - Owners and operators: It should be noted that vaccination has either not been used or is not currently available for FADs.

Other Considerations

Three overarching considerations that are somewhat outside of a facility's control, but that will greatly influence a SAHO's position to allow these activities, include:

- How the status of EAI facilities impacts the **World Organization for Animal Health (OIE)** and international trading partners' positions for exports and trade out of and around the outbreak. Increasingly, the OIE has proposed the concept of compartmentalization[5]. This concept may be used in FAD outbreaks to allow SAHOs to consider different options for disease management in populations of animals that can prove themselves to be separate (i.e. in a different compartment) from other susceptible animal populations. These considerations are important to SAHO and EAI facilities because many see EAI facility collections as in a different compartment from domesticated food animal species production systems. Thus, EAI facilities may be treated differently with regards to activities such as vaccination without affecting the nation's ability to export animal products.
- What other populations of susceptible animals (includes domesticated animals as well as wildlife) are neighbors to the facility, and what is the risk the facility would pose if it were to break with disease. Development of a facility map (in Step 5) will assist SAHOs and facilities to examine their area for proximity of potential risks.
- **Zoonotic Disease** Potential: Those animal diseases that also pose a health threat to humans will fall under the purview of Public Health as well as SAHO. The SAHO and Health Directors on the state and local levels will collaborate on actions needed for response. Human health concerns will likely be given higher consideration by decision makers; therefore contingency plans for animals should be discussed thoroughly between facility owner and health officials so that all concerns can be addressed in advance of any potential zoonotic disease event.

[5] The OIE's *Compartmentalisation Concept Paper* can be viewed at: https://www.oie.int/doc/ged/D2224.PDF

Communication

Secure Zoo Strategy continually points out the necessity of consultation with State Animal Health officials in the development of FAD response plans. It is incumbent upon SAHOs to recognize the unique needs of this animal industry. Cooperation in the development of plans before an outbreak occurs will likely lead to better outcomes, and reduced time needed by SAHOs in dealing with exotic collections.

Preservation

If animal preservation is an important goal of your response plan, that should be articulated to State SAHOs and discussed during planning meetings for FAD response. During this process you may aim to:

- Ensure all stakeholders understand the impact of depopulation on EAI facilities, including their mission, business model, and the sustainability of the species they preserve.
- Develop measures to protect rare, exotic, and/or endangered species from disease outbreaks.
- Propose alternative responses to avoid depopulation in the event that the facility is affected by or exposed to a disease agent.

FADs require the development of response policy and strategies that can be used to assist in the prevention, eradication and recovery from a disease outbreak. One strategy that has been used with variable success historically in food animal production facilities has been the depopulation of premises that have been exposed or infected.

The US Foot and Mouth Disease (FMD) response strategy once considered "**stamping out**" as the preferred method of response to an outbreak. In light of the United Kingdom's FMD experience, and further US response research and planning efforts, there has been increased attention paid to a more managed, strategic eradication approach. Depopulation may still be appropriate in some situations, but current planning on the national level has recognized that alternative methods, such as vaccination assisted managed eradication strategies, must be considered. Further information can be found in the USDA's FMD Response Plan[6].

Impact of Depopulation

There are many reasons that animals are maintained in EAI facilities, including the goal of preservation of rare, exotic, and endangered species. Some facilities may have animals that are critical components of education and outreach programs that help the public better understand nature, animal species survival, ecology, and conservation efforts. Preservation of such animals is important not only to the

[6] The Foot-and-Mouth Disease Response Plan – The Red Book can be found at: https://www.aphis.usda.gov/animal_health/emergency_management/downloads/fmd_responseplan.pdf

collection they are in, but also to the credibility of the response effort as a whole, as it demonstrates a focus on all aspects of successful outbreak management. Depopulation of these rare, exotic, and/or endangered animals would permanently disrupt the mission and business model of a facility and may also determine the fate of a whole species' ability to survive. In some instances, it is a possibility that depopulation would eventually lead to the extinction of a species.

Depopulation of EAI facilities would significantly impact:

- **Conservation**: Species sustainability that could accelerate extinction.
- **Business viability**: Facility sustainability due to a reliance on a visitation business model.
- **Local communities**: These animals are often considered valuable members of communities, and depopulation would cause tremendous public outcry.
- **Public image**: Depopulation would reflect poorly on planning and management of the outbreak in situations where animals could have been preserved, resulting in loss of public support for the response effort.

Valuation of Animals and Collections

The valuation of an individual animal, population, or collection of animals involves many factors. When evaluating a collection, purpose is a factor, which may include preserving a species from extinction, education, exhibition, public appeal, or some combination thereof. Many EAI facilities contain animals with immeasurable value (eg, species on the brink of extinction, such as Micronesian kingfishers) and animals whose value is known to be higher than usual reimbursement rates for the food animal industry (eg, koala replacement ~ $125,000). Domestic livestock valuation efforts can easily obtain guidance by way of real-world market values updated at through daily commerce, but these provide little to no assistance to valuation for zoo, exotic, and wildlife species. The following information is presented to assist EAI facility owners and response stakeholders (including Federal and State Animal Health Officials and the food animal industry) to understand the value of zoo, exotic, and wildlife species.

Dollar Value vs. Intrinsic Value

The concept and results of placing a dollar value on individual animals is challenging. There is concern that placing a dollar value on animals would suggest that they could be easily replaced given the right amount of money, which often is not the case. Additionally, it may distract from the intrinsic value of the individual or species. Often it is not an issue of reimbursement, but of an animal's conservation value or importance to the visitation business model. There is the possibility/likelihood of inconsistent dollar values for same species by different institutions. The following points should be considered when attempting to determine the value of an animal:

- **Investment value:** What is the value of an animal to the owner? This can be determined by:

    - A sales comparison. This determines value by observing sales prices of similar animals. The relevant market would be other EAI facilities around the world. The industry may know what animals are bought and sold for.
    - The cost individuals are willing to pay to hunt various species. The value of the animal would be less than the total cost of the hunt as expenses for guides and travel and other costs must be subtracted. For example, in the US there are hunting preserves for whitetail deer. Generally, the value of hunted whitetail is approximately one-half the fees that the hunting preserves charge.
- **Market replacement value:** What is the cost of replacement? This may be expressed as the expenses associated with breeding a particular species. The expenses associated with the management of rare or endangered species can be quite high. Replacement expenses could be offset for animals that produced multiple offspring by dividing by the number of offspring produced to arrive at a value per head. In discussions with SAHOs, facility owners and operators will find it difficult to determine value for an individual animal if the facility's cost accounting does not separate costs by various species or animal types. If a species is hard to breed, the facility may have invested a lot of money into this program and, consequently, implied value would be very high and should be reflected in accounting (including costs over time).
- **Resource investment:** What value was invested into an animal? This would be the combination of importation costs, years of behavioral training, annual veterinary exams, vaccinations, education value, etc.
- **Public value:** Is the animal or group of animals highly valued by donors, etc.? Favorite animals (e.g., Fiona the Hippo), education animals, and donor favorites would have a higher value to the public.
- **Brand value:** Is the animal a symbol, design, or feature that your organization is known for in the eyes of your visitors? For example, if a facility named "Giraffe Encounter," whose business model includes breeding and exhibiting giraffe, were to suddenly lose all their giraffe to disease, it would surely destroy that "brand." If a facility prides itself in conserving wildlife, depopulation may quickly result in losing the public trust in the brand and institution.
- **Income generation value:** Is a significant portion of revenue derived from specific species? If possible, facilities should identify income from various major exhibits, and share this information in the planning process.
- **Expert opinion:** Do you have access to individuals with specialized knowledge, generally through their network of contacts, who may have an idea of what an animal is worth? Unless these experts are able to provide details on how they arrived at their valuation, it might be best to view them as a supplemental source of information.
- **Conservation value:** Does the population have a particular value to conservation efforts? It is widely recognized in the EAI that there are significant issues with population sustainability in certain species. Governments, non-profit organizations, and the public have invested significant financial resources in conservation efforts in captive (ex situ) and free-ranging (in situ) species. The International Union for Conservation of Nature (IUCN), Convention on International Trade in

Endangered Species (CITES) and the US Endangered Species Act (ESA), and other treaties, laws, and policies will need to be considered. Note: In situations where depopulation of particular animals would contribute to the extinction of that species, conservation may trump any other value.

- **Differentiation in value:** The demographic value of a captive population may differ from a wild population (e.g., young animals of prime reproductive age may be considered more valuable than older, non-productive animals. Some animals are nearly extinct in the wild but abundant in captivity, such as Scimitar horned oryx, which may lower value.)
- **Population or genetic diversity value:** Studbooks are kept on many species in zoological institutions and by private breeders. Rare genetics may be more valuable than genetics over-represented in some animal populations.
- **Reimbursement value:** Certain facilities, when impacted by federally declared disasters, may be eligible for reimbursement of animals (property) lost as part of the Federal Emergency Management Agency (FEMA) reimbursement process. Currently, there are not much data on this method of valuation, and there is no precedent for a federal declaration of disaster in a FAD event.

Investment Value

This table provides a potential model for determining which animals or species should be prioritized for preservation based on their perceived investment and conservation value.

Table 2.1: Potential model for determining value of individual animals/species/populations

Species	Investment value					Conservation value		Total
	Replacement (0-2)	Resource (0-2)	Public (0-2)	Brand (0-2)	Income (0-2)	Ex-situ (0-5)	In-situ (0-5)	
Zoo chicken	0	0	1	1	1	0	0	3
Free-flight macaw	0	2	1	1	2	0	0	6
Micronesian kingfisher	2	2	1	1	0	5	5	16
Zoo goat	0	0	2	1	1	0	0	4
Giraffe	1	1	2	2	2	2	0	10
Panda	2	2	2	2	2	5	5	20

In the above example, a “weighting system” is proposed to assist with determining animal value. The total sum of “value” may help in determining strategies for management during a disease outbreak. Factors included in this system:

- **Replacement:** How easy is it for the facility to find another similar animal?
- **Resource**: Does the facility have the financial resources to replace the animal?
- **Public:** Is the animal highly valued by patrons, donors, etc.?
- **Brand:** Does the animal provide a "brand" to the facility?
- **Income:** Does the animal generate significant income that supports their care and the care of less charismatic animals in the collection?
- **Ex-situ:** What are the conservation concerns of the species in the collection?
- **In-situ:** What are the conservation concerns of the species in the wild?

Ownership

One of the challenges to valuation involves understanding ownership of the animal in question. Some institutions do not own the animals they care for. These animals may be owned by another facility, such as in a lease or loan arrangement, or even by another country (e.g., pandas are owned by China; koalas, wombats, yellow-footed rock wallabies are owned by Australia). Some species are co-owned; whooping cranes, Mississippi sandhill cranes, and Attwater's prairie chickens are co-owned by the United States Fish and Wildlife Service. In certain situations, insurance may be carried for specific species (e.g., pandas reportedly ~$1,000,000). It is highly recommended that facilities understand what animals may be covered by insurance, and if that coverage includes infectious disease.

Preservation vs. Euthanasia (Depopulation)

In the absence of a FAD, the decision to euthanize is currently a collective decision involving animal care and veterinary staff. In the event of a disease outbreak of concern, the decision to euthanize will be made collectively with the SAHO and other regulatory authorities.

Criteria considerations for preservation versus euthanasia/depopulation may include:

- Value of animal/species/population/collection (see Table 2.1, above)
- Ability to isolate an infected animal to prevent disease spread
- Proximity to Infected Zone
- Proximity to Buffer Zone
- Infected/non-infected vs exposed
    - Type of outbreak (e.g., USDA Type 1-6 Hoof and Mouth Disease model[7])
- Ability to vaccinate or treat
- Limitations of safe disposal of carcasses
- Public outrage and political impacts/damage to brand

[7] This can be viewed on pages 9-15 of the Foot and Mouth Disease Response Plan, The Red book at https://www.aphis.usda.gov/animal_health/emergency_management/downloads/phases-and-types-of-an-fmd-outbreak_2013.pdf

Gaps and Next Steps

There are a number of gaps affecting preservation that need additional attention at the facility, State, and Federal levels. For example:

- There is a lack of guidance to address the fact that most EAI facilities do not know the true value of their collections, or fully understand their contribution to the economy.
- Few facilities have previously considered institution-specific plans that address preservation for high-risk disease outbreaks.
- There is a lack of understanding of disease and vaccine response in diverse species, and questions remain about the reliability of using disease detection methods designed for livestock in exotic species.
- There is a lack of knowledge of clinical signs that would indicate a FAD outbreak and allow for effective active observational surveillance among animal care personnel. This is exacerbated by the fact that some EAI facilities may have intermittent or suboptimal veterinary support.

Preservation of animal collections in the event of a FAD outbreak will be challenging. Discussing the goal of preservation with SAHOs as part of the planning process will allow a facility to establish concerns prior to an outbreak and determine strategies and tactics to support that goal.

Animal Movement within the EAI

There are a number of reasons why animals are transported to, from, or between EAI facilities. These movements may be needed to meet needs of the individual animal (e.g., husbandry and medical care), to benefit the species (e.g., breeding or preservation programs), or to benefit the facility (e.g., begin or maintain a collection). Depending on the facility, movements may happen daily or rarely.

To minimize spread of disease during a FAD outbreak, permits will need to be issued for any movements of animals or animal products in restricted areas. In order to consider issuing a permit SAHOs will need to understand the facility's business model, what biosecurity is currently in place, what species are being considered for movement and reasons for that movement, and how frequently movements would occur. Some reasons for movement may include:

- **Animal husbandry/welfare considerations:** Facilities may need to move animals to accommodate the need for additional space or appropriate housing. Decisions are based on many factors, such as social dynamics, behavior, sexual maturity, age, and size. Renovations or construction of new facilities often necessitate transport.
- **Conservation efforts:** Transfers for breeding purposes include shipping of endangered or threatened species, eggs, and in some cases, genetic material; these movements occur both domestically and internationally.

- **Contracts:** The legal trade or transport of animals may be a contractual obligation between facilities, the United States Fish and Wildlife Service (USFWS) (e.g., movement of black-footed ferrets for reintroduction programs), or international governments (e.g., the movement of pandas from/to China).
- **Entertainment:** Some members of the EAI provide animal entertainment shows. Their business model relies heavily on frequent intra- or interstate transportation of animals.
- **Education/Outreach programs:** These animal movements bring different species to offsite locations (e.g., recreation centers, schools, nursing homes) and may or may not be associated with "stand-alone" zoological parks, sanctuaries, or rehabilitation centers.
- **Natural disasters:** Weather emergencies (e.g., floods, hurricanes) or man-made disasters (e.g., fires, chemical spills) may necessitate rapid transport of animals.

Movement of Animals during a FAD Event

Agricultural production animals are moved constantly as part of the food supply chain. Most EAI facilities would likely have the ability to hold animals in place much longer than agricultural animals. Owners and operators of EAI facilities must realize that "stop movement" orders may be in place for extended periods of time in a Control Area, especially in the event of a newly emergent or particularly virulent disease. However, there may be compelling reasons to move healthy animals outside of a Control Area during a FAD event:

- **Animal Welfare:** Animals may be moved/relocated because of space issues. Sub-optimal space may lead to aggression and injury to animals and staff. Sexual maturity of animals may dictate that animals be relocated.
- **Species Conservation:** To conserve a threatened or endangered species, moves must take place for reproduction. Additionally, movement of genetically valuable animals "out of harm's way" may prevent infection in those individuals, thereby allowing them the opportunity to continue contribution to a small gene pool.
- **Business model:** Some exhibitors rely solely on movement of animals for purposes of display, entertainment, or education. These businesses are potentially the most vulnerable to stop movement orders.

Facility owners/operators must recognize that movement of animals within and to outside a Control Area will be by permit only. It is highly recommended that facilities obtain a Premises ID for the site where animals are held (e.g., not the owner's address) by working with their SAHO. Having a Premises ID will expedite the permitted movement process during a FAD event, which will be critical.

Current Practices that Support Animal Movements during FAD Events

Traceability of susceptible animals will be a requirement for the allowance of animal movement during disease events. Identification should be noted in the animals' permanent records and could include, but is not limited to, the following:

- Bands, tags
- Microchips
- Notching
- Photos
- Physical characteristics
- Distinct physical patterns
- Colorations/marking (individual)
- Eye scans
- Footprints/fingerprints

Disease surveillance compliance and the documentation of surveillance will be strong considerations in the decision by regulatory officials for movement of animals during a disease event. (Additional information on Surveillance will be provided in Step 6.) Considerations for movement may include:

- Collection of samples and testing, as prescribed by the SAHO, to determine the status of animals to be moved.
- Written daily observations for the animal collection, including pre-movement monitoring for clinical signs of disease and documentation of separation from other animals to limit the chance of exposure (information on Active Observational Surveillance (AOS) is included in Step 6).
- Written medical records for collection, including overall knowledge of herd history for diseases.
- Training of staff to recognize the signs of disease.
- Requirement of post-movement surveillance, observation +/- isolation during outbreak.

Example: Movement during a FMD Outbreak

With the detection of FMD in the country, it is very likely that the need for future shipments of animals will be re-evaluated by both the shipping and receiving facilities. Out of an abundance of caution, shipments will likely be carefully evaluated, even when not geographically located in a Control Area.

If your plan is to continue to accept animals from outside facilities, make sure you fully understand the health status (and any newly imposed requirements due to disease outbreak) of imported animals by requiring entry accreditation, including Certificates of Veterinary Health (animal), and the health status of facility of origin and area. Contact your SAHO's office with specific questions.

The US response to FMD (or any other FAD) will largely depend on the phase and type of the outbreak, therefore decisions on animal movement cannot be prescriptive.

Movement must pose minimal risk of disease spread outside of the Control Area. SAHOs have the statutory authority to permit animal movements and may implement restrictions beyond the recommendations in the table below.

Table 2.2: Recommended Strategies for Movement of Animals within the Exotic Animal Industry

Planned shipments after disease detected in US	
If:	**Then:**
The shipment is originating from a facility outside of the Control Area with no epidemiologic link or concern of exposure, and the destination facility is outside of a Control Area	It is recommended that shipment be allowed to continue as planned, provided that: • All necessary health certificates have been obtained • Animals are observed for clinical signs and tested for disease depending on SAHO protocols and disease agent • Permission is granted by the SAHO of destination
The shipment is originating from a facility outside of the Control Area with an epidemiologic link confirmed, or with a link to a suspect premises	Movement should be delayed until risk has been assessed
The shipment is originating from a facility within the Control Area	Stop planned movement until risk assessment and permitting processes have been established

Shipments in transit after disease detected in US	
If:	**Then:**
The shipment originated from a facility outside of the Control Area with no epidemiologic link or concern of exposure, and the destination facility is outside of a Control Area	It is recommended that the shipment be allowed to continue to its destination, provided that: • The destination is in a **Free Area** • All necessary health certificates have been obtained • Animals are observed for clinical signs and tested for disease for 14 – 30 days, depending on disease agent • Permission is granted by the SAHO of destination
The shipment originated from a facility within the Control Area	The shipment should be halted until risk is assessed. In this situation: Shippers should have contingency plans in place Suitability for permitted movement within and outside of the Control Area will be assessed and may continue if approved by SAHO at origination and destination
The shipment originated from a facility outside of the Control Area with an epidemiologic link to a confirmed or suspect premises, or the transport route took the shipment through a Control Area	The shipment should be assessed. In this situation: • A risk assessment will determine if the shipment is suitable to continue permitted movement to a Free Area facility, or if it should be returned to the Control Area for continued observation/surveillance • Shipments should have a contingency plan in place, in case the SAHO of the destination refuses to allow animals to be delivered due to disease risk

Roles and Responsibilities

Communication between SAHOs in both the state of origination and the state of destination, and between the shipping and receiving facilities is paramount when moving animals during a FAD outbreak. It is recommended that facilities anticipating shipments of animals to other states develop pre-outbreak

permit protocols with those SAHOs to develop an understanding of all party's responsibilities. Permit information should include points-of-contact, especially those needed to expedite decisions and notifications regarding exotic animals that may be caught in transit during the initial phases of an outbreak.

Animal Movement and Biosecurity

Strict adherence to biosecurity protocols will be a requirement for facilities to receive permits to move animals during a disease outbreak. Appropriate biosecurity protocols will ultimately be determined by the SAHOs of states through which the shipment is moving. SAHOs may require that a facility demonstrate an ability to perform the measures described in their biosecurity plan. Sharing this plan during a facility walkthrough pre-outbreak will provide the SAHO and facility operator with a mutual understanding of the level of biosecurity the proposed actions would provide.

Animal transporters must recognize that their routines may be altered to increase biosecurity during movement. Transporters may be called upon to note if trailers or transport vehicles are enclosed and explain any potential exposure of animals to environment while traveling. Transporters should be capable of conducting observational surveillance for signs of disease during an outbreak so that they can report animals showing such signs during the transport. Transporters should be able to explain their basic transportation protocols, and they should recognize that standard procedures may change during a disease event. Changes to normal routines may include:

- Heightened disinfection protocols
- Restricted stops/driver never leaves cab
- No mixing of animals from different facilities
- No stopping at other animal facilities with susceptible species
- No changes in approved routing
- No picking up of food products
- No removal of feces or bedding materials or foodstuff en route
- Use of appropriate biosecurity apparel

Guidance for transporters is being developed in concert with other Secure Plans, and this document will be updated with that information as developed. A reference that is currently helpful is the National Animal Health Emergency Management System (NAHEMS) Biosecurity document[8].

Shipment Contingency Plans

Facilities that routinely ship animals should develop contingency plans that address the needs of animals in transit if movement is stopped for any reason. This is even more important if the shipment of animals is occurring during a FAD outbreak. Shipment contingency plans should include:

[8] The NAHEMS Biosecurity Guidelines can be accessed at http://www.cfsph.iastate.edu/pdf/fad-prep-nahems-guidelines-biosecurity

- Contact information for the SAHOs of all states through which the shipment is moving.
- 24-hour points of contact from the sending and receiving facilities, and transport personnel.
- Alternative shipping options in case the current shipper or receiving facility cannot fulfill required obligations for biosecurity.
- Alternative locations for animals that cannot continue to the intended destination. Knowledge of facilities en route to the destination that could house animals should be gathered and SAHOs should be contacted to determine if quarantine facilities that could safely house these species have been pre-designated. Feed and other supplies must be able to be delivered in a timely manner.
- Appropriate veterinary points of contact with experience in the species being shipped along the route.
- Alternative routing; some states have pre-identified alternative through routes which represent low-risk corridors for continued animal movement.

Animal movement may be a critical component of a facility's business model, and it is highly likely that many movements will be halted during the early stages of an outbreak response. Facilities should understand the factors discussed in this guidance and use that information to consider how plans can be made for a more rapid resumption of animal movements.

Guidance for Facilities Practicing Assisted Reproductive Technologies (ART)

Frozen genetic material is increasingly being collected and housed in many EAI facilities. This practice may be the key to preserving genetic material in the face of depopulation, and it is an important consideration in business continuity planning for FADs. Facilities practicing gamete collection, cryopreservation, artificial insemination, or other **ARTs** should share the appropriate specifics to their SAHOs during the planning process. Preservation and permitting movements of collected materials would be key goals to address.

Since many bacterial and viral diseases may be transmitted through semen, the importance of clean technique and proper storage of materials is imperative. Depending on how a facility collects, utilizes, stores, and ships materials, there may be some decision points that should be considered and discussed with SAHOs.

Decision Points for Facilities Practicing ARTs

Depending on the proximity of infected areas and current premises designation, transportation of valuable animals away from high-risk areas may be easier than banking genetic materials. However, if immobilization for shipping is part of the procedure, samples might be collected at that time. Discuss

what testing would be required at the time of shipment, and what testing would need to be done by the receiving institution to confirm the animal was disease free at the time of banking.

Depending on the Zone and Premises designation of the facility, samples collected within days of an outbreak might be considered potentially infected unless disease screening was performed, and samples are known to be disease-free. This "window" is determined by the disease itself, the known incubation period, and other factors. Establishing a disease screening and quarantine protocol for sample banking prior to an outbreak will ensure increased likelihood of disease-free biomaterials. Shipping biomaterials in or out of the facility's genome resource bank during heightened disease risk should be carefully considered. If the materials originate from or are entering into a Control Area, a risk assessment by regulatory authorities will be performed, and movement will be via permit.

If materials are being collected from animals during an outbreak situation, it may be prudent to use a separate "isolation tank" until the outbreak is over to maintain the integrity of the tanks. Virgin liquid nitrogen should always be used for topping off tanks of stored reproductive biomaterials.

Note: If depopulation is recommended because of disease risk, it can be assumed all biological materials associated with the animals collected at time of likely infectivity will also be destroyed.

Best Practices

In addition to decision points, a discussion of your best practices or protocols should be a part of your meetings with your SAHO. If these practices would differ in any way during a FAD outbreak, agreements on exactly how they would differ should be made and documented ahead of time.

An in-depth review of best practices in individual ARTs is beyond the scope of Secure Zoo Strategy however, certain practices for genomic resource banking deserve mention here, as they are critical concepts.[9]

- The importance of health exams and disease screening should be considered when adding animals to herds. This is no less important when adding biomaterials to tanks.
- Each storage tank should be considered a "collection," and transfer of biomaterials into each tank should take a risk-based approach to managing potential exposure to pathogens that could be introduced when 'new' material is added to the tank.
    - Individual identification of biomaterials, record-keeping, and risk assessment, with initial storage in an isolation tank is prudent to prevent contamination of other stored biomaterials.

[9] This was informed by an abstract presented at the American Association of Zoo Veterinarians 2016 Annual conference "Proposed Guidelines for National Movement of Bovidae Semen Between Zoological Institutions" Penfold, LM; Hall, N; Pye, G.

- Standardization of collection and storage procedures should be considered, if not already in practice.

The South-East Zoo & Aquariums for Reproduction & Conservation (SEZARC)[10] standardized a ranking code used by its members to assist with labeling and classifying samples based on disease risk. A label (I-IV) is assigned to each sample based on the following criteria:

i. Samples originate from a closed population that are subject to annual exams, vaccination program, and/or negative disease testing at time of collection
ii. Samples originate from a closed population with no annual exams or vaccination program
iii. Samples originate from an open (free-ranging) population from an animal that was subject to quarantine and negative disease testing
iv. Samples originate from an open (free-ranging) population with no disease surveillance or quarantine

Specific biosecurity measures will be more fully addressed in Step 5 of the Secure Zoo Strategy.

Review and Develop Goals

Each EAI facility is different in a number of respects, including the business side of operations. Funding/revenue sources and how the facility maintains itself are all important and can be heavily impacted if a FAD outbreak restricts activities that provide income to the facility. Thus, understanding your overall business model is important to the preparedness planning process. In this step, you have learned about a variety of business models. To review:

- **Preservation:** All EAI facilities aim to preserve the animals in their collections, but some animals may have more complex considerations than others. Your SAHO needs to be informed about preservation plans and about the relative value of those animals. If the preservation of the animals in your collection is an important source of support and/or revenue, you will need to understand the impact a decision to depopulate part or all of your collection would have on your facility. If your collection includes animals with varying preservation value, then you will need to construct a preservation prioritization plan that would describe which animals would be most important. Finally, if your animals can be valued in dollar terms, you will need to work through those valuations.
- **Animal Movement:** Most exotic animal facilities engage in animal movement to some degree. FAD outbreak response regulations often limit movements of susceptible animals as an attempt to control spread of disease. Your SAHO will need to understand the types and frequency of animal movements at your facility. In addition, there are specific actions your facility will need to take to allow those movements in a FAD outbreak. These specific requirements will be dictated by response authorities.

[10] Additional information about SEZARC is available at https://www.sezarc.org/

- **Visitation:** Some exotic animal facilities include visitation as a key component of their business model. If your facility has visitors, your plan will need to address the increased risk associated with having visitation during an outbreak and you will need to work with your SAHO to develop your biosecurity plan to account for this risk. Completing the steps in the Secure Zoo process will address multiple goals, including development of that plan.
- **Assisted Reproduction:** Assisted reproduction is highly specialized, and it is not a component for all facilities. If you participate in assisted reproductive technology, please refer back to the guidance included earlier in this step and be prepared to share your procedures with your SAHO.

After evaluating your business model, discuss the goals and objectives that should be developed for business continuity. These goals and objectives will determine the Performance Standards that your facility will need to demonstrate to protect your business and your animals. Discuss how goals (e.g., "To re-open as soon as possible") can be translated into objectives (actionable steps). You may consider using Specific, Measurable, Attainable, Relevant, and Time bound (SMART) goals[11] to make these objectives achievable. Use the worksheet included at the end of this step to organize your goals and objectives.

[11] More detail on the National Academies SMART Objectives can be found here: http://www.nationalacademies.org/hmd/About-IOM/Making-a-Difference/Community-Outreach/Smart-Bites-Toolkit/~/media/17F1CD0E451449538025EBFE5B1441D3.pdf

Assessment

Now that you have read through Step 2, it is time to assess your progress

The following assessment checklist includes a number of tasks that you have already begun or completed in your planning process. Use this assessment to track your progress, record any additional actions that your team is planning to take at each risk level, and take notes on what still needs to be done for Step 2 at your facility.

A final Assessment Checklist will be included in Step 10.

Preplanning for Preservation

- [ ] Use the worksheet below to determine goals and objectives for preserving your collection during disease events, if applicable.
- [ ] Determine the value of your collection. This could be monetary value, conservation value, or any way the facility chooses to assign value (such as value to the community if an animal is iconic). Determine a hierarchy of animals or species that may be your highest priority for preservation.
- [ ] Use prioritization and valuation of animals/species to guide response tactics, such as movement, preservation activities (vaccination), or euthanasia.
- [ ] Assemble pertinent valuation information to share with your SAHO. Discuss how best to preserve your collection; this discussion will help determine biosecurity strategies and tactics. If possible, prioritize response (e.g., isolation, euthanasia, isolation) by species and biosecurity level.
- [ ] _____
- [ ] _____

Preplanning for Animal Movements

- [ ] Use the worksheet below to help you determine goals and objectives for movement of animals during disease events, if applicable.
- [ ] Ensure that your SAHO understands the importance of animal movements to your business model.
- [ ] Discuss movement protocols to implement when moving any animal **into or out of** the collection to minimize disease risk, recognizing appropriate permits (e.g., Certificates of Veterinary inspection), and establishing isolation of new incoming animals as appropriate and required.
- [ ] If your facility is engaged in rehabilitation of wildlife, create intake protocols that protect "permanent" animal populations by setting up intake, holding, and permanent animal housing areas as well as an isolation area. Discuss conditions that would halt rehab animal intake.

- [ ] Discuss the permitting process that will likely be required for Control Areas to ensure you understand what might be required to allow movements (documentation/premises ID numbers and then surveillance and biosecurity measures, which will be discussed in later steps).
- [ ] Use the worksheet below to help you determine goals and objectives for movement of animals during disease events, if applicable.
- [ ] _____
- [ ] _____

Preplanning for Visitation

- [ ] Use the worksheet below to help you determine goals and objectives for visitation during disease events, if applicable.
- [ ] Ensure that your SAHO understands that visitation is a critical part of your business model, if applicable.
- [ ] Calculate how long your facility can remain solvent while closed due to disease. Share this information with your SAHO.
- [ ] Discuss whether your SAHO will want to require a permit for visitation for the facility if it is located in a Control Area. SAHOs would likely require specified surveillance and biosecurity measures to grant a permit.
- [ ] Develop contingency plans for a visitation model (e.g., transitioning from self-guided contact tours to supervised non-contact tours) for those facilities that allow interaction with animals.
- [ ] _____
- [ ] _____

Preplanning for Assisted Reproductive Technology

- [ ] Use the worksheet below to help you determine goals and objectives for assisted reproductive technologies during disease events, if applicable
- [ ] Ensure that your SAHO is aware that gametes, embryos, or other reproductive materials are stored on site.
- [ ] Establish sound standard operating procedures for preservation of genetic material that minimizes disease risk.
- [ ] Develop recordkeeping practices for gamete storage tanks (this will be important in disease tracing activities).
- [ ] _____

Notes

Goals and Objectives Worksheet

Use the tables below to list goals and objectives based on your facility's business model.

Preservation

Goal	Objectives
Preserve the collection.	Create isolation area, dedicate staff, etc.
Preserve a particular species.	Isolate that species, depopulate/move other susceptible species, etc.

Animal Movements

Goal	Objectives
Move animals as part of a breeding program.	Pre-outbreak, receive Premises ID from SAHO.
	Pre-outbreak, discuss facility breeding program and movements with your SAHO.
	Pre-outbreak, establish biosecurity and surveillance protocols to allow premises status to be upgraded from At-Risk to Monitored during an outbreak.

Visitation

Goal	Objectives
Postpone visitation if facility is located in infected zone.	Conduct surveillance and implement biosecurity to apply for permit to begin to receive visitors.
Implement visitation policy/protocols during outbreak to allow for permitted visitation.	Pre-outbreak, discuss with your SAHO your facility outbreak visitation plan, with mapped areas including isolation, staff areas, and visitor areas.
	Pre-outbreak, establish biosecurity and surveillance protocols to allow premises status to be upgraded from “At-Risk” to “Monitored” during an outbreak.

Assisted Reproductive Technologies (ARTs)

Goal	Objectives

Other

Goal	Objectives

Step Three

Facility Risk Assessment

Facility owners/operators need to understand the factors that put their facility at risk of becoming infected in an outbreak. This is an area where your State Animal Health Official (SAHO) can help. In your risk assessment, you will need to assess:

- Types of diseases and the susceptibility of the animals in your facility (your SAHO can help).
- Risk from your facility's activities with animals, personnel, and visitors. This could include movements, deliveries, feeding, etc.
- Risk of a disease spreading to your facility from neighboring farms or wildlife.
- Risk of a disease spreading within your facility if one area were to become infected.

This step will introduce concepts of risk assessment, review what factors might contribute to a facility's disease susceptibility, and provide guidance to help you conduct a disease risk assessment at your facility.

What Makes a Facility Vulnerable to Disease?

The risk assessment process thoroughly examines a facility's characteristics to determine the collection's risk and impact of Foreign Animal Diseases (FADs) or other diseases of concern. Secure Zoo Strategy is currently focused on Foot and Mouth Disease (FMD) as a model disease, as it is a highly contagious disease affecting multiple species with catastrophic impact, but this same technique is applicable for any disease agent. A thorough assessment may also provide some reassurance to neighboring animal industry that the nearby exotics are not a high risk to their livelihoods. In a thorough risk assessment, many disease entities should be discussed as potential hazards.

Risk Assessment for Diseases

It is important for all Exotic Animal Industry (EAI) owners and operators to have an understanding of risk assessments, particularly for disease, regardless of what species their facility manages. Since it would be impractical to expound on every disease, it is recommended that facilities begin by developing a list of diseases of concern. Diseases of concern and the associated risks vary from state to state, but they can often be identified on the SAHO's website and the state's Reportable Disease list.

Understanding that facilities may have little funding or limited time to dedicate to planning, facility owners and operators must identify and categorize risks so plans can be developed for *high likelihood and/or high consequence hazards***.** A conceptual formula to assist with determining risk is as follows:

Risk = Hazard + Likelihood + Vulnerability + Consequence

Facilities will naturally prepare for their high likelihood risks, but it is also recommended that facilities consider planning for high consequence/low likelihood events. While not disease related, Gordon Graham's presentation on High Risk/Low Frequency Events in the Fire Service [12] is recommended for viewing, as it does an excellent job of illustrating why these types of events have a high probability of negative consequences and the need to plan accordingly.

Determining Risk

The following example will use FMD as a model to illustrate how facilities can walk through each of the factors in order to use the formula for determining risk.

Hazard

When considering the hazard presented by a specific disease, facilities should consider how infectious that disease is, the implications an outbreak would have on their collections (as well as on agriculture and trade), and the zoonotic potential of the disease.

The FMD virus, eradicated from the United States in 1929, is among the most contagious viruses on earth. It primarily affects cloven-hooved animals and clinical signs include vesicular lesions of oral mucosa and coronary band. High fever, intense salivation, and difficulty eating causes in-appetence and loss of body condition in adult animals, and may cause death in young animals. A positive diagnosis results in trade restrictions of agricultural products from countries with confirmed cases of disease, and it is incredibly damaging to animal production and related businesses in the affected country.

Due to its devastating effects on agriculture and infectious nature, the World Animal Health Organization (OIE) considers FMD a Containment Group 4 animal pathogen, placing it among the most dangerous and considered a potential bioterror weapon. Fortunately, FMD is considered to be of low zoonotic potential; the several cases of transmission that have occurred have only resulted in mild disease in people.

If there were to be an FMD outbreak, the United States Department of Agriculture and SAHOs would apply control measures that may include depopulation of exposed animals in order to return animal agriculture to normal business operations as soon as possible. Movement restrictions, intense cleaning and disinfection protocols, and other measures will highly restrict "business as usual" for affected/adjacent premises for weeks or months.

The infectivity and implications of FMD infection make this a significant hazard that must be considered in the risk assessment process.

[12] High Risk/Low Frequency Events in the Fire Service, presented by Gordon Graham for the U.S. Fire Administration. https://www.youtube.com/watch?v=Og9Usv82CdU

Likelihood

When working to determine the likelihood of a disease impacting their facility, owners and operators should consider the following: if the disease is present in the country, state, or county where the facility is located; if the disease can impact or be spread via species in the collection; and potential modes of introduction.

Currently, the likelihood of an FMD outbreak is low, as FMD is not in the US at this time. However, facilities should consider the possible modes of introduction of the virus into the US. Introduction could occur via an intentional bioterror agent, accidental introduction from contaminated products entering the US legally, or accidental introduction from contaminated products smuggled into the country illegally (e.g. bushmeat). Millions of pounds of animal products enter the US every day, making it impossible to test every lot.

Vulnerability

To determine vulnerability to a certain disease, facilities must consider any weaknesses that would make them more likely to be impacted by that disease.

A very basic example of vulnerability compares the species and locations of two facilities to determine which is more vulnerable to FMD. Facility A manages multiple species known to be susceptible to FMD, and it is located in an area with significant cattle production. Facility B only has one susceptible species, and it is located in an urban environment. In this example, Facility A is more vulnerable to FMD than Facility B.

Consequence

Consequences must be considered as part of the risk equation. Facilities should evaluate how a disease event could impact their business operations and collections, how long these impacts could last, and how or if they would be able to recover from said event.

For example, FMD will be a very high consequence event for facilities with susceptible species. Business operations would be severely impacted, possibly for weeks or months, in an attempt to control the disease, and the facility may be unable to recover. Because of the high consequence of FMD, planning for it will assist with preparedness for a multitude of infectious agents and emerging diseases.

Additional Factors for Consideration

Once individual disease hazards have been identified, the risk assessment team should discuss the factors that contribute to the likelihood of disease, the facility's vulnerability to disease, and the consequence of disease detection. A facility should develop plans for high likelihood and high consequence hazards.

Facility factors that may contribute to *increased* likelihood and vulnerability to FMD and other diseases include:

- Business model considerations (See Step 2).
- Composition of the animal collection and susceptibility to FMD (or other diseases of concern).
- Potential contact between animal collection and visitors that could serve as vectors (or reservoirs) of disease.
- Facility location, if near concentrations of susceptible agricultural species (e.g., game ranches located adjacent to cattle farms).
- Possible contact between wildlife vectors and collections (e.g., feral hogs interacting with species on open pastures/ranges).
- Frequent transfer of animals between facilities, which may carry unapparent infectious agents
- Introduction of new animals directly to a herd without prior isolation.
- Traveling exhibits, which may bring disease agents back to facility.
- Staff working or owning susceptible animals outside of their roles at the facility, which increases the possibility of disease exposure to the collection.
- Food sources that may inadvertently carry infectious agents (e.g., 2015 outbreak of Highly Pathogenic Avian Influenza in a falconry was associated with the feeding of apparently healthy hunter-harvested waterfowl that had been in a freezer for months).
- Vendors and other traffic (e.g., drive-through parks) having access to the facility, as they may serve as mechanical vectors for some disease agents.
- Biologic products brought on-grounds with unapparent infectious agents (e.g., as in artificial insemination)
- Water features shared with nearby infected facilities (e.g., streams which run to or from an infected facility could carry disease agents).

Facilities may not be able to prevent the introduction of FMD into the country, but their practices may protect their collections from becoming infected, or allow for quicker detection in their animals**. Facility factors that may contribute to decreased likelihood and vulnerability to FMD and other diseases include:**

- Following alerts about disease issues from SAHOs, USDA, and other trusted sources.
- Implementing and consistently following routine biosecurity protocols to limit introduction of disease agents
- Robust training programs for staff regarding disease agents, Personal Protective Equipment (PPE), signs of disease, and biosecurity protocols.
- Development and distribution of appropriate messaging to decrease risk to the collection from visitors (where visitation is practiced).
- Isolating animals prior to introduction to a collection to allow for detection of a disease agent prior to exposing a naïve animal or animals.

- "Closing" collections to the addition of new animals or minimizing movement of new animals into collections without adequate quarantine procedures and facilities.
- Training staff to observe animals on a frequent basis and report signs of disease (this may prompt quicker diagnosis of disease and prevent spread).
- Using veterinarians experienced with exotic species to provide quick identification of disease. Veterinarians are encouraged to be USDA Category II accredited for exotic species.
- Recognition of husbandry guidelines regarding space, which typically prevents overcrowding and may decrease risk of disease spread between animals.
- Increased frequency of individual animal examinations and surveillance opportunities (e.g., preventative health programs, opportunistic exams or pre-shipment exams, and Certificates of Veterinary inspection) to increase the likelihood that a disease may be recognized more quickly.
- Practicing preventative vaccination programs if available (at this time, FMD vaccination is not practiced in the United States).
- Conducting necropsies and diagnostic sampling of animals to reveal disease agents affecting the herd or collection, and reporting to all appropriate agencies and/or organizations.

The consequence of detection of FMD anywhere within the US will have significant impacts on the nation's agricultural economy. Detection of FMD near your facility would severely limit your ability to conduct business as usual due to regulatory restrictions placed to prevent disease spread. Detection of FMD within a collection could be catastrophic.

Doing a Risk Assessment of your Facility

Facility owners/operators need to understand the factors that put their facility at risk of becoming infected in an outbreak. This is an area where your SAHO can help.

Assess the types of diseases and the susceptibility of the animals in your facility (this should involve your facility's veterinarian and SAHO)[13]. Your SAHO will be able to share diseases of most concern from the reportable disease list for your state, as well as their experiences with other disease responses that would be helpful for your plan. Ask yourself the following:

- Does your facility have multiple species susceptible to diseases of concern?
- How are the diseases of concern for your collection spread? Are they vector borne, airborne, spread by animal contact, by **fomites** (e.g., personnel), or are they zoonotic?
- Do these diseases of concern have a reservoir population (e.g., as wild birds for avian influenza) that is located near your facility?

[13] See AAZV Infectious Disease Manual (2013) found at http://www.aazv.org/?754 and European Association of Zoo and Wildlife Veterinarians (EAZWV) Transmissible Diseases Handbook found at https://eazwv.site-ym.com/page/inf_handbook?&hhsearchterms=%22infectious+and+disease+and+manual%22 to assist in assessment of susceptibility.

Assess the risk of disease spread from neighboring farms or wildlife. Close proximity to some domesticated food animal production premises can be both a risk and an asset. Understanding the risks posed by nearby animals, whether they are domesticated, feral, or wild, is a critical component of biosecurity programs:

- There is a potential risk to an EAI facility as disease can spread from one to the other.
- The surveillance information that could come from neighboring “food animal” premises may help provide supporting proof that the area is remaining negative.
- Understand the native wildlife populations that are present and evaluate perimeter fencing or other barriers designed to eliminate or reduce contact with collections.
- Determine the need for pest control programs to reduce possible disease transmission

Assess the risk normal activities pose to your facility (e.g., animal and personnel [including visitors] movements, deliveries, feeding). Consider the following:

- Many disease agents can be carried into your facility by personnel, in feed, on bedding, or by equipment that has not been decontaminated or treated properly. Understanding how personnel and these materials enter your facility is critical to understanding the risk that may be associated with them.
- Live animals brought into the facility are always a concern for introduction of disease. Understanding the risk for movement of animals in and out of the facility is a key to protecting against, and preventing outbreaks.

Assess the risk of spread within your facility if one area were to become infected. The negative ramifications of an outbreak in any facility are considerable. For EAI facilities desiring to preserve their collections, an important consideration is how to limit disease spread as much as possible. Ask yourself:

- What are the risk factors that would allow disease to spread throughout the facility?

Assessment

Now that you have read through Step 3, it is time to get to work.

The following assessment checklist includes a number of tasks that you should consider completing. You may have already begun or completed these in your planning process. Use this assessment to track your progress and to record any additional actions that your team is planning to take. Use this sheet to take notes on what still needs to be done for Step 3 at your facility. Keep in mind, disease risk will change during an outbreak, and these actions may need to be revisited.

A final Assessment Checklist will be included in Step 10.

- [ ] Review the Disease Risk Worksheet and the Wildlife Site Assessment Zoo Questionnaire (found in the Resources section of Step 3) with your attending veterinarian. Use these documents and other noted references to conduct a risk assessment of your facility. Determine if additional protective measures can be taken to reduce risk of disease.
- [ ] Discuss risk from and to neighbors that have susceptible species for diseases with cross-contamination concerns (e.g., facility to agriculture/agriculture to facility)
- [ ] Share the results of your self-assessment with your SAHO. Discuss any additional actions that can reasonably be taken to reduce the risk of disease.
    - Explore identified threats with your SAHO, including those without obvious mitigation/prevention strategies. In some cases, there may be resources available to reduce risk that are known to your SAHO, but might not be known to you. An example might be decontamination agents or equipment that could be mobilized for mitigation assistance.
- [ ] _____
- [ ] _____

Notes

Disease Risk Worksheet

This checklist is a handy tool to assess your facility's basic protocols that affect risk of disease. This checklist is based upon the National Animal Health Emergency Management System (NAHEMS) and the Australian National Zoo Biosecurity Manual (ANZBM) documents found in the Resources section for this Step. As you confirm that your facility can define, then meet or exceed the suggested practice, check off each item in turn. The "Notes" column may be used to describe work yet to be done, why this step may not be applicable, or to assign responsibility to complete and completion dates.

Risk of disease is predicated on your day-to-day operating procedures as they relate to biosecurity and animal health. This Disease Risk Worksheet is designed to assist you in assessing your current risk status. In Step 5 of the SZS Plan, you will work through components of biosecurity for your facility that help you understand when to heighten your protocols based on a heightened disease threat. The following are general elements of a biosecurity plan:

- *A health program for all animals*
- *Protocols for inspection, testing, and isolation of incoming animals*
- *Programs to control pests, wild animals, and stray domestic animals*
- *Hygiene protocols for staff and visitors, as appropriate*
- *Isolation of sick animals*
- *Management of waste materials and drainage*
- *Cleaning and disinfecting of equipment, vehicles, etc. to prevent disease spread*

Basic Considerations

	In Place	In Progress	N/A	NOTES
An appropriate cleaning schedule has been established and is adhered to.	☐	☐	☐	*Use this space to include notes relevant for your facility. Some examples are included below.*
Stagnant water accumulation is avoided, and drained as appropriate.	☐	☐	☐	
Drainage patterns avoid flow of water with waste from entering adjacent areas.	☐	☐	☐	
Cleaning and disinfection of equipment/enrichment items occurs before moving to other areas of the facility.	☐	☐	☐	
Substrate is replaced when needed.	☐	☐	☐	
Waste (e.g., bedding, manure) is disposed of appropriately to avoid pathogen transmission.	☐	☐	☐	
Hospital, necropsy, or isolation areas have been designed, modified, or constructed to meet the unique needs of each specialty area.	☐	☐	☐	
Adequate and working hand washing stations are provided for staff and all visitors.	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

Food and Water Supply[14]

	In Place	In Progress	N/A	NOTES
All feed meets minimum health and hygiene levels based on species needs.	☐	☐	☐	*Use this space to include notes relevant for your facility. Some examples are included below.*
Foodstuffs are sourced from suppliers who work to prevent spoilage and avoid contamination by pests and disease agents.	☐	☐	☐	
Foodstuffs are stored to prevent spoilage, and avoid contamination by pests and disease agents.	☐	☐	☐	
If animals are fed carcasses, the supply is evaluated for disease risk.	☐	☐	☐	
Drinking water is free of pathogens.	☐	☐	☐	
If aquatic or semi-aquatic species are kept, water quality is maintained to the standards of the species.	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

[14] See Australian National Zoo Biosecurity Manual (ANZBM) pages 17 – 19 for additional information https://www.zooaquarium.org.au/wp-content/uploads/2011/10/National-Zoo-Biosecurity-Manual-March-2011.pdf

Pest Management (Insects, Vermin, Strays, Wild Mammals, and Birds [15]

	In Place	In Progress	N/A	NOTES
Insects and animal species that are pests have been identified based on facility location and species managed.	☐	☐	☐	
Cleaning and sanitation protocols that discourage pests, or make the facility less attractive for nuisance species, have been developed.	☐	☐	☐	
Feeding protocols that minimize food waste, which attracts wild and nuisance species, have been developed.	☐	☐	☐	
Protocols to manage stray or domestic animals found on property have been developed.	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

[15] See Australian National Zoo Biosecurity Manual (ANZBM) pages 19– 20 for additional information https://www.zooaquarium.org.au/wp-content/uploads/2011/10/National-Zoo-Biosecurity-Manual-March-2011.pdf

Contractors, Vendors, and Vehicles [16]

	In Place	In Progress	N/A	NOTES
Contractors and vendors are educated on disease(s) they may be exposed to coming on grounds.	☐	☐	☐	
Staff recognizes and investigates any potential disease risks that might be associated with a contractor or vendor.	☐	☐	☐	
Facility ensures equipment used by contractors or vendors is appropriately cleaned and disinfected before and after use.	☐	☐	☐	
A list of contractors and vendors who work in the facility, especially of those that work in the animal areas, is maintained.	☐	☐	☐	
The risk of driving machines through the facility (including stress on animals) is recognized.	☐	☐	☐	
A record of vehicles that enter enclosures, pastures, or animal transport to/from or within the facility (to be used in disease trace back) is kept.	☐	☐	☐	
Vehicles that come on the property are visibly clean and free of animal manure, etc.	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

[16] See ANZBM pages 27– 28 for additional information

Facility Visitors [17]

	In Place	In Progress	N/A	NOTES
Any potential disease risk that may be associated with visitation is recognized.	☐	☐	☐	
The additional risk of visitation when coupled with direct animal contact is recognized.	☐	☐	☐	
Any staff or volunteers working in contact areas are trained in zoonotic disease risk and the messaging that should be shared with visitors to these areas.	☐	☐	☐	
Specific protocols directed at minimizing risk of disease spread between animals and visitors in animal contact areas have been developed.	☐	☐	☐	
Animals selected for contact areas are appropriately monitored for disease.	☐	☐	☐	
Hand-washing or other cleaning protocols in contact areas are maintained and staff instructs visitors to adhere to these protocols.	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

[17] See ANZBM pages 28 - 30 and the National Animal Health Emergency Management (NAHEMS) Biosecurity Guidelines, page 11 at https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/fadprep_nahems_guidelines_biosecurity.pdf for additional information

Animal Movement [18]

	In Place	In Progress	N/A	NOTES
Senders and receivers discuss disease risks to determine responsibility for implementation of various biosecurity protocols before, during, and after shipment.	☐	☐	☐	
Sending facility makes sure animal shipment cages, crates, etc. are cleaned and disinfected.	☐	☐	☐	
If staff is accompanying a shipment, they know what steps should be taken in transit to meet any isolation protocols (see below in animal isolation).	☐	☐	☐	
Shipments comply with any required permits (e.g., Certificates of Veterinary Inspection)	☐	☐	☐	
Manure, bedding, or other waste generated during transit is collected and properly disposed of upon reaching the destination.	☐	☐	☐	
If a commercial shipper is being used, their biosecurity protocols are first obtained to determine if they are adequate, paying special attention to the shipper's disinfection protocols between shipments. Note: Domestic animals should not be shipped with exotic species.	☐	☐	☐	

[18] See ANZBM pages 46 - 47at https://www.zooaquarium.org.au/wp-content/uploads/2011/10/National-Zoo-Biosecurity-Manual-March-2011.pdf

Isolation areas meet standards from regulatory agencies or associations.	☐	☐	☐	
A biosecurity assessment is conducted on each animal coming into the collection.	☐	☐	☐	
Staff is trained in enhanced biosecurity procedures for newly acquired animals and maintains those standards until the isolation period is deemed complete.	☐	☐	☐	
Animal care personnel tend to animals maintained in isolation areas after tending to healthy collections.	☐	☐	☐	
Equipment is dedicated to isolation areas, and strict cleaning and disinfection protocols are followed before equipment is used elsewhere.	☐	☐	☐	
The cause of death is determined for animals that die in isolation, whenever possible.	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

Management of Sick and Deceased Animals [19]

	In Place	In Progress	N/A	NOTES
Staff is trained to recognize behavior changes that may signal illness in animals, and knows to whom potential illnesses should be reported.	☐	☐	☐	
Animals are observed daily for signs of illness, whenever possible.	☐	☐	☐	
There is a process to document and report ill animals for veterinary assessment.	☐	☐	☐	
Staff is trained to report unusual numbers of dead wildlife, which may signal an infectious disease that could harm an animal collection.	☐	☐	☐	
Protocols for documenting and reporting dead animals to owner/operators are in place.	☐	☐	☐	
Retrieval, storage, and disposal protocols minimize potential infectious disease spread.	☐	☐	☐	
Carcass disposal protocols meet municipal, county, or state standards.	☐	☐	☐	

[19] See ANZBM pages 43 – 45 and the NAHEMS Biosecurity Guidelines page 14 at for additional information

The facility veterinarian consults in a timely manner with SAHO and other regulatory officials when in doubt about abnormal numbers of animal mortalities or disposal concerns.	☐	☐	☐	
Protocols for carcass disposal during a FAD or infectious disease event have been determined to be adequate and permissible by the SAHO.	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

Click here to enter text.

	In Place	In Progress	N/A	NOTES
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Additional Resources

General

- Risk Assessment Key Component, for facility veterinarians: http://www.cfsph.iastate.edu/Infection_Control/Overview/OverviewofBRMMar2005.pdf

Existing reference materials available to assist with disease risk analysis

- Deem, S.L. 2012. Disease Risk Analysis in Wildlife Health Field Studies. In: Fowler's Zoo and Wild Animal Medicine: Current Therapy 7, Publisher: Saunders Elsevier, Editors: R. E. Miller and M.E. Fowler, pp.2-7.
- IUCN/SSC Guidelines for Wildlife Disease Risk Analysis (2014): http://www.cbsg.org/sites/cbsg.org/files/documents/IUCN%20Wildlife%20DRA%20Guidelines%20PUBLISHED%202014.pdf
- IUCN/SSC Manual of Procedures for Wildlife Disease Risk Analysis (2014): http://www.cbsg.org/sites/cbsg.org/files/documents/IUCN%20Wildlife%20DRA%20Manual%20PUBLISHED%202014_0.pdf

Existing references for infectious diseases

- OIE Animal Disease Information Summaries: http://www.oie.int/for-the-media/animal-diseases/animal-disease-information-summaries/
- Center for Food Security and Public Health: http://www.cfsph.iastate.edu/
- USDA APHIS Animal Health: http://www.aphis.usda.gov/wps/portal/aphis/ourfocus/animalhealth
- AAZV Infectious Disease Manual (2013): http://www.aazv.org/?754
- State and Federal reportable disease lists (state lists available on SAHO websites) https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/monitoring-and-surveillance/sa_disease_reporting/voluntary-reportable-disease-list
- European Association of Zoo and Wildlife Veterinarians Transmissible Diseases Handbook https://eazwv.site-ym.com/page/inf_handbook?&hhsearchterms=%22infectious+and+disease+and+manual%22

Step Four

Roles for Personnel

It is extremely important that Exotic Animal Industry (EAI) facility owners and operators understand the response roles personnel would play in a Foreign Animal Disease (FAD) outbreak. Were a facility to have a FAD outbreak on-site or in close proximity the success or failure in prevention and response would be largely determined by the staff's readiness.

This step will introduce you to important roles for staff and how those roles fit into the larger command structure during an outbreak. As a prerequisite to this step, please read the *Concept of Operations Plan: Management of an Avian Influenza Outbreak at a Zoological Institution*[20]. This document will provide important information on how State and Federal Animal Health Officials (SAHO and FAHO) would manage an outbreak at a zoological institution.

The Roles your Facility Personnel May Play in an Outbreak

If a FAD outbreak involves your facility, your personnel and their readiness will determine how successful you are in preventing or responding to an outbreak. SAHOs can provide guidance but many, if not all, of the activities conducted at your facility will be performed by your staff or other support personnel. Important roles for your staff would include:

- **Owner/Policy Liaison:** This role should be filled by a person with the knowledge and authority to make decisions for the facility and work with the SAHO's Incident Management Team (IMT). Determine who in your facility should act in this role, as needed, during the preparation phase as well as during an outbreak. Very large facilities may split these roles among ownership or a board acting to make policy decisions for the facility and a designated person acting as the liaison to the SAHO. In other facilities, the owner may serve as the decision maker but also designate someone, such as the facility manager, to be the liaison. Policy questions that the person(s) in this role must consider include the following:
    - How would animals in the collection that are on loan or owned by other entities be treated?
    - Are there any animals in the facility that management would recommend be euthanized rather than managed through FADs their species is susceptible to?

[20] https://www.aphis.usda.gov/animal_health/downloads/animal_diseases/ai/hpai-zoo-conops.pdf

        - For example: While effort would be spent to conserve rare hoofstock species, euthanasia may be considered for domestic hoofstock in the same facility (such as in a petting zoo).
    - Under what conditions would the facility halt visitation, or other activities that contribute to income, in order to protect its collection?
    - How could the facility's business model survive if visitors or animal movements are not allowed?
        - For example: How many "days until a year's net profit is lost"?
    - If the disease proves to be zoonotic, what would the facility's staff-related policies be?
- **Operations Manager:** This person will be coordinating and directing the staff of the facility in response activities, and potentially interacting directly with the Operations Chief of the SAHO's IMT managing the outbreak for the state. When determining who in your facility would act in this role, please remember that this person would be the "person in charge of the facility" directing activities. A good choice for this position is often the person who handles day-to-day operations and staff assignments. Operational tasks that need to be completed pre-outbreak include:
    - Designating a Biosecurity Manager to ensure biosecurity protocols are implemented and adjusted as needed during an outbreak. (More about Biosecurity Manager duties will be found in Step 5.)
        - Note: The Operations Manager may decide to oversee this function in smaller facilities.
    - Designating isolation areas for protection of the susceptible animal populations, as well as support areas (feeding, disposal, and storage).
    - Designating staff and roles for each area of the facility.
    - Establishing and updating relevant protocols for the facility and its designated areas, including, but not limited to:
        - Biosecurity
            - Note: The Operations Manager would work with the Biosecurity Manager to craft the biosecurity protocols for each area in the facility.
        - Disposal and decontamination
        - Surveillance
    - Discussing which surveillance methods may comply with state surveillance requirements with the facility planning team. (Surveillance will be discussed more thoroughly in Step 6).
    - Discussing biosecurity, disposal, decontamination, and surveillance protocols with the SAHO before an incident, to ensure the equipment and capabilities to perform the tasks exist or can be acquired before an outbreak occurs.
- **Biosecurity Manager:** The Biosecurity Manager's role is to work with the Operations Manager to craft and oversee the biosecurity protocols for the facility, including entrance and exit protocols for the areas of the facility that will require enhanced biosecurity during an outbreak (these will

be designated in Step 5). Additional tasks would include reviewing the staff, visitor, and vendor pathways to ensure there are no overlaps that would present biosecurity concerns. As the Biosecurity Manager reviews the facility's operational plan, any biosecurity concerns should be discussed with the Operations Manager. In small facilities, the Operations Manager may also take on the role of Biosecurity Manager. This role will be discussed in greater detail in Step 5.

- **Facility Public Information Officer (PIO):** A facility's Public Information Officer (PIO) is the person designated to work with the IMT's PIO to share and provide information to media and the public on behalf of the facility. The facility PIO should have all communications from and regarding the facility approved by the Owner/Operations Manager to ensure that the best and most accurate information is shared. To designate a facility PIO, determine who at the facility would be the best person to speak on behalf of the facility during an outbreak. This person should be familiar with dealing with the media, and have a working knowledge of how the facility operates and its goals during an outbreak. Public information tasks may include the following:
    - Preparing messages that reflect the facility's efforts to help protect its animals and, if the disease is zoonotic, personnel and visitors.
    - Preparing messages for the public that would convey the facility's perspectives and objectives in the event that visitation is suspended.
    - Meeting with the SAHO's PIO to share ideas and messaging prior to an outbreak.
    - Monitoring and updating appropriate social media outlets to share information on behalf of the facility.

As you meet with your SAHO, it is important to develop an understanding of how the proposed roles for your personnel would interface with the IMT's response structure. You will see more information about how (and when) these positions come into play during response in the coming steps.

Figure 4.1, below, shows how information and tasking would flow up and down the personnel positions for the facility. Please also note that while local, state, and federal Emergency Operations Centers (EOCs) are required to be based on the ICS, do not be surprised at variations in how these requirements are implemented in your area.

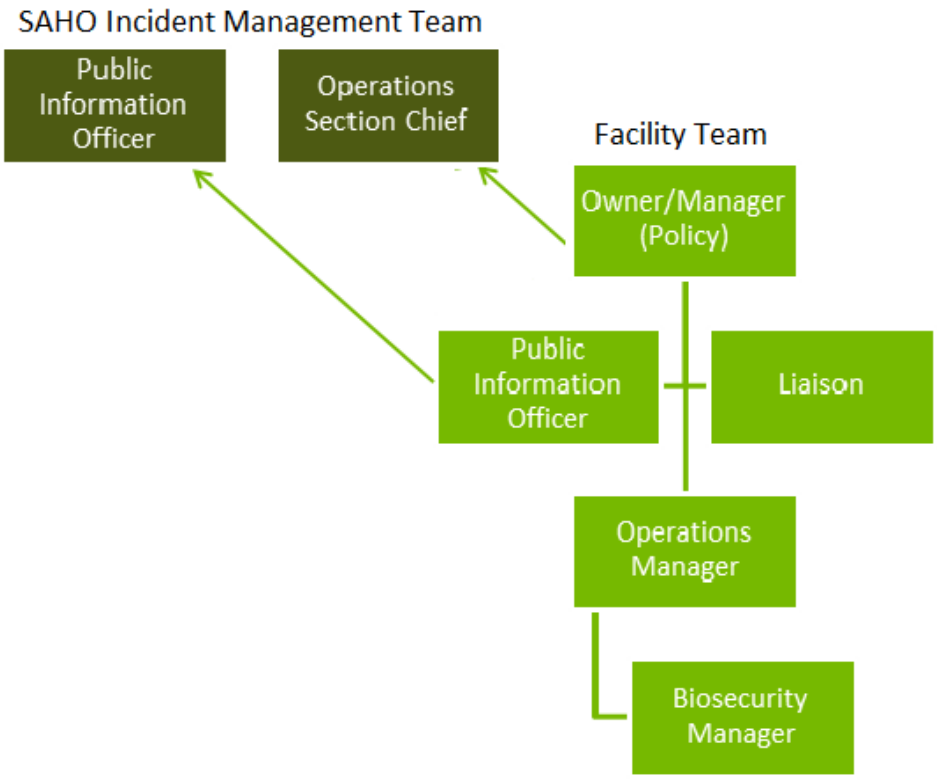


FIGURE 4.1: RESPONSE ROLES

Assessment

Now that you have read through Step 4, it is time to assess your progress.

The following assessment checklist includes a number of tasks that you have already begun or completed in your planning process. Use this assessment to track your progress, record any additional actions that your team is planning to take at each risk level, and take notes on what still needs to be done for Step 4 at your facility.

A final Assessment Checklist will be included in Step 10.

- [ ] Identify what roles staff would play in a response, and identify those individuals that best fit those roles. (Under the direction of the SAHO, the facility must be prepared to assist in response.)
- [ ] Identify which staff members are the most critical to respond on your behalf during a disease event. These individuals must be capable of following biosecurity protocols, must be proficient at following directions, and must be keen at observing animals and reporting signs of illness.
- [ ] Identify staff that are trained in public affairs and social media matters or identify other resources available to manage the influx of calls, stories, and communications associated with an outbreak.
- [ ] Identify any additional training that staff requires to assist in a Foreign Animal Disease (FAD) event. This may include additional training on the Incident Command System, the use of Personal Protective Equipment (PPE) (essential in zoonotic diseases), and cleaning and disinfection protocols (see Step 5). Review your list of training with your SAHO.
- [ ] Identify the trained individuals who would represent the facility in support of the SAHO Incident Management Team (IMT). These individuals should have the authority to make critical decisions for the facility. (Minimum recommended training for any facility representative would be ICS 100, 200, and 700.)
- [ ] Incorporate any new training into your facility training program. Suggest a "date by" which any new training should be completed, and record completion of any new training requirements.
- [ ] Conduct an "in-house" exercise where your staff can work through a scenario that would help them practice their roles. Your SAHO can assist you in crafting a scenario that would be interesting and informative to staff.
- [ ] _____
- [ ] _____

Notes

Outbreak Response Position Worksheet

Identify the appropriate personnel for each role within your facility

Note: In small facilities, the Owner/Manager may serve in the Owner, PIO, and Liaison roles, and the Operations Manager may serve as the Biosecurity Manager.

Role	Responsibility	Person
Facility Owner/Manager	Assists with policy decisions for facility	
Liaison	Represents the facility to the SAHO 's personnel	
Public Information Officer (PIO)	"Voice" for the facility	
Operations Manager	Oversees the operations, both during plan development and in an actual event	
Biosecurity Manager	Oversees the biosecurity protocol development prior to and implementation during an event	

Agency Contacts Worksheet

Fill in the below information to create an easily accessible list of all agency contacts that may be relevant during a FAD response.

- **State Veterinarian (SAHO):** *Located through your state agricultural department or boards*
  - Name: _____
  - Email: _____
  - Phone: _____
  - Work Address: _____
- **SAHO Operations Manager:** *Located through your state agricultural department or boards*
  - Name: _____
  - Email: _____
  - Phone: _____
  - Work Address: _____
- **SAHO Public Information Officer (PIO):** *Located through your state agricultural department or boards*
  - Name: _____
  - Email: _____
  - Phone: _____
  - Work Address: _____
- **Area/District USDA Representative:** *This may be your inspector or another representative, and someone you should already have a working relationship with. If not, search the USDA website for your region.*
  - Name: _____
  - Email: _____
  - Phone: _____
  - Work Address: _____
- **State Public Health Director:** *Located through your state public health website*
  - Name: _____
  - Email: _____
  - Phone: _____
  - Work Address: _____
- **Local Public Health Director:** *Located through your local and country public health website*
  - Name: _____
  - Email: _____
  - Phone: _____
  - Work Address: _____

Local Emergency Management

Identifying contacts for local emergency management may take more work, as it is not always obvious who manages emergency response for your location. Typically, this information can be found on local or county websites. Note: Local Emergency Management may have very little authority in a disease response; however, working with them is vital for other incidents of concern.

- **Title:** _____
  Agency: _____
    - Name: _____
    - Email: _____
    - Phone: _____
    - Work Address: _____

- **Title:** _____
  Agency: _____
    - Name: _____
    - Email: _____
    - Phone: _____
    - Work Address: _____

- **Title:** _____
  Agency: _____
    - Name: _____
    - Email: _____
    - Phone: _____
    - Work Address: _____

- **Title:** _____
  Agency: _____
    - Name: _____
    - Email: _____
    - Phone: _____
    - Work Address: _____

Additional Resources

General

- Concept of Operations Plan: Management of an Avian Influenza Outbreak at a Zoological Institution: https://www.aphis.usda.gov/animal_health/downloads/animal_diseases/ai/hpai-zoo-conops.pdf
- ICS Training: https://training.fema.gov/nims/
- ICS 100 for Zoos: https://zahp.aza.org/incident-command-system/

Step Five

Biosecurity

The information provided in this step is intended to enable Exotic Animal Industry (EAI) facility owners and operators and State Animal Health Officials (SAHOs) to develop and evaluate site-specific biosecurity programs. Effective biosecurity programs are needed to prevent outbreaks and to prevent interruption to visitation and operations (revenue and conservation) in the event of an outbreak or risks associated with Foreign Animal Diseases (FADs).

This step of the Secure Zoo Strategy (SZS) will introduce and illustrate important concepts in biosecurity, provide participants with a list of recommended practices, and guide them through describing standard operating procedures in their own facilities in order to form the foundations of a strong, site-specific, biosecurity plan. To accompany this step, SZS has developed a biosecurity mapping tool that allows facilities to identify areas of activities that affect biosecurity and specify biosecurity protocols, which can then be provided to SAHOs.

Biosecurity for the Exotic Animal Industry

Biosecurity is the key to preventing FADs from spreading to EAI facilities. The National Animal Health Emergency Management System (NAHEMS) defines biosecurity as a "collection of measures or management practices intended to protect animals or humans against the introduction and spread of disease or harmful biological agents." Protection of animals and humans from zoonotic disease is paramount. Biosecurity entails implementing measures that either prevent disease organisms from gaining entrance into the facility itself (**bioexclusion**) or, at least, from gaining access to susceptible animals. SZS relies on many of the same biosecurity measures mentioned in other Secure Plans (e.g., Milk, Beef, Pork, Egg), and the Foreign Animal Disease Preparedness and Response Plan (FADPReP) guidance documents.

There are a number of routes of disease introduction, which include aerosol, direct contact, oral, fomite, vector, and via zoonotic exposure. Therefore, biosecurity measures must be tailored to account for those routes that are relevant to a particular disease. Many of the biosecurity measures provide protection from all transmission routes, but some routes (e.g., vector borne) may require additional measures of protection, such as vaccination, which will be covered in other areas of SZS as well as in the resources provided in this step.

Facilities should consider these 3 steps when developing a biosecurity plan[21]:

1. **Identify and prioritize the disease agents of greatest concern to the facility.** Since FMD is a highly contagious agent, the Secure Zoo Strategy was built with Foot and Mouth disease (FMD) as the agent of concern. The suggested biosecurity protocols will protect against many diseases. A facility should identify which diseases concern them in their risk assessment (refer to Step 3 for more information).
2. **Conduct an assessment of the facility.**
   Think about how animals, people, vehicles, etc. move around the facility. The Mapping Tool introduced later in this step allows users to visualize how movement occurs and to determine physical places, such as entrances and exits to exhibits, where pathogen movement could be controlled by implementing biosecurity measures at **Controlled Access Points (CAPs)**.
3. **Develop and implement processes and procedures to minimize the likelihood of pathogen transmission.**
   The activities in this step will help you determine what processes and procedures you may need to add to your facility's biosecurity plan.

It is the responsibility of an individual facility to protect their collections, staff, visitors, and vendors from contamination and diseases. Prevention is the best strategy for business continuity, and protective measures should be taken to mitigate a potential FAD outbreak. In order for protective measures to be effective, they must be strictly adhered to. These include entrance protocols, exclusion from free-ranging wildlife and feral domestic species, decontamination procedures, and staff protocols. Many of these protective measures are currently in practice at many EAI facilities, but additional activities will be needed to protect facilities during heightened risk of disease.

During disease events, Federal and State Animal Health Officials (FAHOs and SAHOs) will use tools such as premises designations (Infected, Contact, Suspect, At-Risk, and Monitored) to denote the status of farms and facilities. These, in addition to Zones (geographic areas a certain distance from infected premises), help officials denote what level of biosecurity should be used in the facilities affected by an outbreak. For more information, refer to Step 1, FAD Response - Zones and Premise Designations.

Biosecurity Managers

To ensure that biosecurity protocols and activities are carefully thought through at EAI facilities, each facility should designate a Biosecurity Manager. The role of a Biosecurity Manager is to work through the biosecurity guidance found in FAD documents, such as Secure Zoo Strategy (SZS), with the goal of building a biosecurity program for their facility. It is strongly recommended that the Biosecurity Manager work with SAHOs during this process. Outside resources that Biosecurity Managers should be familiar with include:

[21] FAD PReP/NAHEMS Guidelines: Biosecurity (2016) pg. 7; http://www.cfsph.iastate.edu/pdf/fad-prep-nahems-guidelines-biosecurity

- **Biosecurity reference documents**
  These informational resources, developed for the pork, dairy, poultry, and beef industries, have formed the basis of the recommendations being used for the EAI. It is highly recommended that biosecurity managers review these biosecurity references before beginning planning, as they further explain biosecurity principles, which can then be translated into site-specific plans.
    - NAHEMS Biosecurity Document[22]
    - Secure Beef Supply Biosecurity Training Materials[23]
    - Secure Pork Supply Biosecurity Training Materials[24]
    - Poultry Biosecurity Resources[25]
- **FAD Training Modules[26]**
  Developed by Lincoln Park Zoo in 2008 as a response to the threat of Highly Pathogenic Avian Influenza (HPAI) to special avian collections, these training modules remain relevant today. These are a great place to start for facilities just beginning preparations for FAD threats.
- **Center for Food Security and Public Health: Iowa State University[27]**
  This website is a great resource for agricultural biosecurity guidance, which can be applied to the exotic animal industry. There are also disease fact sheets and other references for biosecurity managers.

Biosecurity Concepts

Before planning begins, the overarching concepts of biosecurity should be understood by the planning team. These include:

- **Conceptual Biosecurity:** This refers to where a facility is located with regard to other premises that hold susceptible animals, and the scope and size of nearby operations.
- **Structural Biosecurity:** Structural biosecurity measures focus on using the physical layout or structures of a facility to promote a bio-secure living/exhibition space for the animals. Structural features such as fences, walls, and designated pathways may be used to help isolate and protect susceptible animals from exposure to disease. Such features can be used to construct Lines of Separation (LOS), which define specific areas within the facility and restrict access to all but authorized and trained personnel in order to lower the risk of spreading disease to the collection. Permanent structures may also be used, but require medium- to long-term planning perspectives for facility design. LOS and Controlled Access Points (CAPs) are critical concepts. These features will be represented on a map that can be drawn using Google Earth and the Secure Zoo legend. Mapping will be discussed further in Step 5.

[22] http://www.cfsph.iastate.edu/pdf/fad-prep-nahems-guidelines-biosecurity
[23] http://securebeef.org/training-materials/biosecurity/
[24] http://www.securepork.org/training-materials/biosecurity/
[25] http://poultrybiosecurity.org/
[26] http://zahp.aza.org/influenzas-of-non-domestic-species/
[27] http://www.cfsph.iastate.edu

- **Operational Biosecurity:** How a facility is managed to prevent introduction of pathogens. This includes personnel protocols and how equipment and materials are moved through the facility.

It is highly recommended that your planning team read the FAD PReP/NAHEMs Guidelines: Biosecurity document [28] for more information on these concepts.

Biosecurity Levels

SZS recommends that a facility develop their biosecurity plans using the concept of "levels," which could be implemented depending on risk of disease. By establishing different **levels of biosecurity**, facility managers and SAHOs are able to address varying levels of risk that are inherent in disease outbreak situations. In previous disease outbreaks, including the 2014-2016 HPAI outbreak, FAHOs and SAHOs implemented varying levels of biosecurity protocols at premises based on distance and relationship to infected premises.

Level 1: Preventive Biosecurity

These protocols are designed to prevent introduction of a disease at facilities outside of the Control Area during the threat or occurrence of an outbreak. This basic level of biosecurity would be implemented when threat of an outbreak is raised, either due to introduction of the disease agent, or due to a higher than normal risk of introduction (e.g., waterfowl migration for HPAI). These biosecurity measures are preventive in nature, focusing on mitigating risks from the disease agent's potential routes of entry into the facility to prevent infection of the collection.

The "At the Gate" and "At the Barn Door"' biosecurity protocols used by the poultry industry are examples of **Level 1 Preventive Biosecurity**. These biosecurity designations provide that equipment, vehicles, and personnel arrive clean, use personal protective equipment (PPE), be disinfected at the Gate (entry) of the premises, and then add additional protection of clean hands (gloves) and clean/change footwear before entering the holding areas for the animals (At the Barn Door). Limiting visitors to the premises and not associating with premises housing the same species were also part of this level of biosecurity in poultry industry plans.

Level 2: Control Area Biosecurity

These enhanced biosecurity protocols are used at facilities located in the Control Area (At-Risk and Monitored Premises), and they would vary for each disease outbreak (but could be extended for months to years during and after an outbreak). This level includes measures found in Level 1 and adds additional actions for decontamination (e.g., enhanced vehicle cleaning and disinfection), stricter PPE requirements, and restrictions of entry for the facility/premises. **Level 2 Control Area Biosecurity**

[28] See NAHEMS Guidelines: Biosecurity pg. 8 at https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/fadprep_nahems_guidelines_biosecurity.pdf for additional information

measures would be implemented in situations where the disease agent is known to be present in the area, or where there is increased risk of spread.

Level 3: Quarantined/Infected Premises Biosecurity

This is the strictest level of biosecurity and is intended to contain an outbreak or potential outbreak in Infected, Contact, or Suspect Premises within the Control Area. These measures reinforce the restrictions placed on a facility by the quarantine order, on those premises where testing for the disease agent has been confirmed as positive by an approved animal health laboratory (Infected Premises), or where an investigation is ongoing (Contact or Suspect Premises). **Level 3 Quarantined/Infected Premises Biosecurity** is designed to contain the disease agent (**biocontainment**) and prevent it from spreading from the facility.

The ability to implement business continuity actions such as preservation, animal movements, and visitation, will hinge directly on how well individual facilities develop and implement biosecurity plans. The more facilities can demonstrate that biosecurity will mitigate the inherent risk to those essential business practices, the more likely FAHOs and SAHOs will support business continuity in the EAI.

Utilizing Lines of Separation Based on Facility Layout

Lines of Separation (LOS) are established to isolate susceptible species from disease agents; this can be achieved by separating areas and traffic flow, and through policies. The concepts of each method of separation are detailed below.

Separation of Areas

This concept works to provide levels of separation, with the ultimate goal of having the animal habitat area located in the most biosecure level. Before being granted access to an area, attending staff and necessary equipment must undergo the strictest biosecurity protocols, implemented at Controlled Access Points (CAPs). CAPs are the entrances and exits where biosecurity programs, including Personal Protective Equipment (PPE), Cleaning and Disinfection (C/D), and other protocols, are required to ensure that disease agents are not moved into or out of adjacent areas. In this method of separation:

- **Secure/isolation area** would be the most biosecure area within the facility and would house susceptible animals with the goal of preventing their exposure to the disease agent.
- Visitor areas would be managed to allow only hands-off interaction with animals.
- Vendor access would be managed by utilizing a separate entry, or a protocol for vendors established, using the visitors entrance at off hours.
- Outside areas are separated from animal habitat by fencing/walls/space, protecting animals from contact with wildlife or other feral animals. Due to barrier permeability and the mobility of the species of concern, some animals, such as birds, will present challenges.

Separation of Traffic Flow

Facility layout allows for separate flows (access) of people in order to maintain lines of separation between people who the facility has little control over in regards to biosecurity standards (e.g., visitors, vendors), versus those who can be expected to adhere to biosecurity standards (e.g., staff who will interact with animals and their habitats). Traffic areas have decontamination/change of clothing stations located at strategic points.

Separation through Policy

By implementing protocols requiring Line of Separation efforts that will stipulate the physical isolation of certain animals, the risk of disease exposure is lowered. The exact protocols required depend on the disease agent in question. Examples:

- Confirming visitors to the facility have not traveled to areas that have an active outbreak within 14 days of visit to the facility.
- Requiring visitors/vendors to undergo biosecurity measures such as decontamination of footwear/hands or wearing PPE as they enter.
- Requiring staff to undergo biosecurity measures (e.g., shower, change clothes) to enter the Buffer Area, and then further (e.g., change/decontamination of footwear, wash hands) before entering the animal habitat.

Example Facility

Figure 5.1, below, is a simple illustration that shows how separation of areas and traffic flow may be utilized at a facility.

The Green Controlled Access Point (CAP) is a location where biosecurity protocols would have to be performed to allow visitors access to a visitor area of the facility. The Red Controlled Access Points (CAPs) are those locations where stricter measures must be taken by staff. Since staff has greater access to animals, they will need to take greater precautions to prevent infection in the collection.

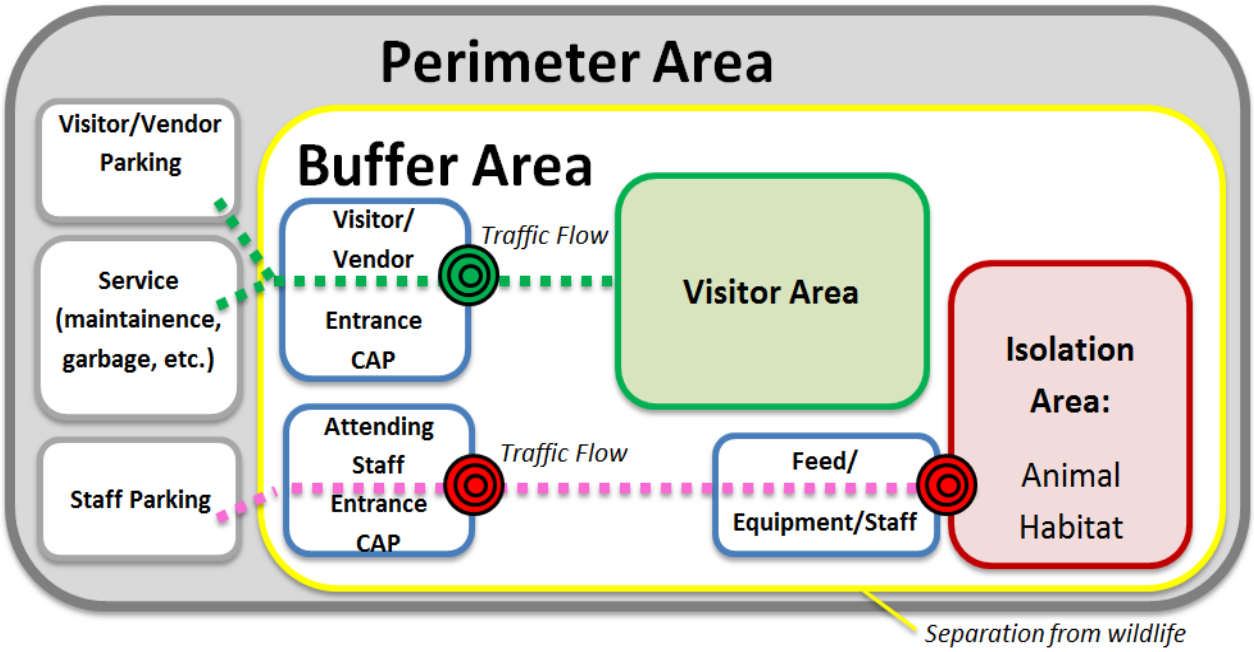


FIGURE 5.1: EXAMPLE OF LINES OF SEPARATION

Biosecurity and the Mapping Tool

By now, your team should have an understanding of partnerships and your facility's business model, have examined and documented the risks applicable to your facility, and considered what roles staff may play in a disease response. **You are ready to start working on developing your biosecurity plan.**

It is highly recommended that you review the guidance documents and references that have been provided, and familiarize yourself with terms introduced throughout Steps 1-4 before you begin biosecurity plan development.

Remember, you will want to consider creating your plan with levels of biosecurity in mind. Implementing Level 3 biosecurity protocols, the strictest possible, may not be necessary in every situation. It is important to accurately implement biosecurity for many reasons, including that over-utilization of strict biosecurity measures may lead to a degree of fatigue among personnel and ultimately a reduction in the efficacy of biosecurity protocols. Additionally, your biosecurity plans must be achievable in a real-world setting, and you will need to demonstrate your ability to implement them State Animal Health Officials (SAHO) will determine if your facility can continue business operations, therefore, the provided forms in this workbook should be customized based on their recommendations, type of disease outbreak, and other factors unique to your facility and collection.

Understand your Facility's Layout

Well-designed maps require no translation and are easily understood in an emergency. Therefore, it is highly recommended that you develop a map of your facility using the Mapping Tool provided. Before you begin biosecurity planning, it is also recommended that you review a current map of your facility to understand movement and space usage during normal operations. Where are the public access areas? How do people move through your facility? How are exhibits, pastures, or other enclosures accessed by staff for feeding and cleaning? These are a few of many functions that mapping will help address. It is also important that areas of your facility be identified by how they are used, and that the activities in each are understood by the planning team so that the appropriate biosecurity measures can be established and implemented as necessary at times of heightened disease risk.

During this examination of your facility's operations, your team should discuss *how use of the facility may be altered to decrease risk of disease*. For example:

- Can sections of your facility or ranch be isolated using Lines of Separation (LOS)? This can be accomplished either structurally by blocking off areas, or operationally by prohibiting access to paths or roads for personnel or vehicles that could introduce pathogens to susceptible species.
- Can areas of the facility be modified in some way, for example, by moving valuable species to more "internal" pastures or exhibits, acting to further isolate them from wildlife (conceptual

biosecurity)? This concept is a crucial component and such areas are designated on the mapping legend as “Isolation Areas.”

These are examples, but as you study your physical layout with your team and understand how it is used and by whom, you will begin to identify how you might adapt your operations to further protect your animals from disease.

The Value of the Mapping Tool

One of the benefits of using the Secure Zoo Mapping Tool is that you can draw in your LOS and CAPs right on the map, and then add in what steps need to be taken at each area to bio-exclude or bio-contain disease.

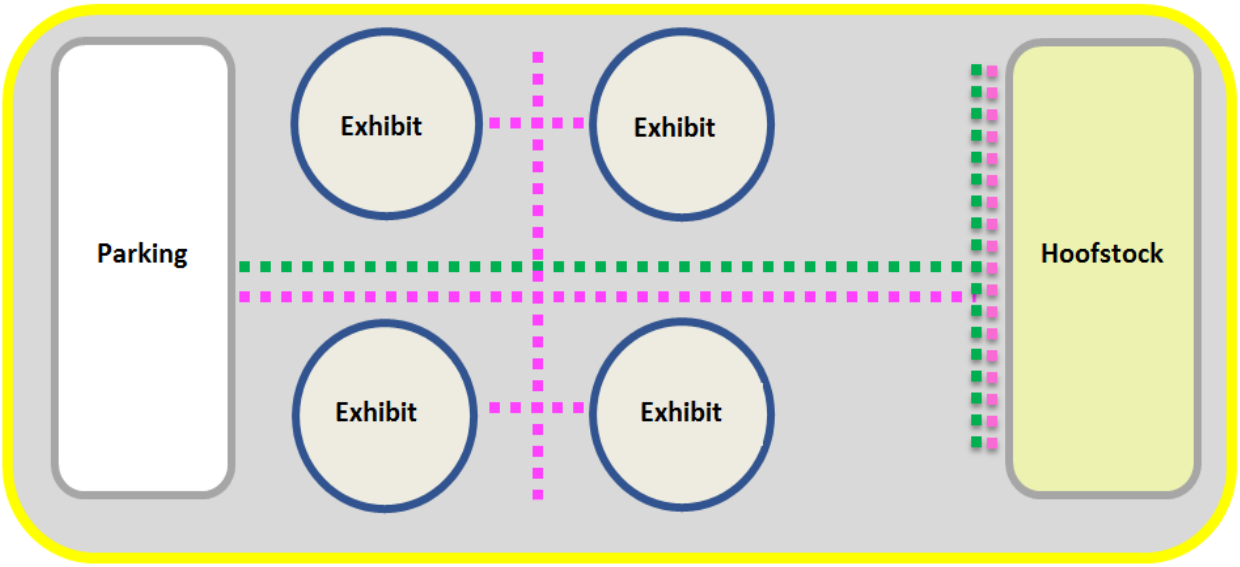
Example: Normal Operating Procedure

See figure 5.2- below, showing the normal operating procedures of a small zoo that allows guests and staff to park in the same lot.

- The hypothetical zoo has 4 exhibit areas, represented in blue, and a hoofstock holding area in yellow.
- Visitors use designated pathways (green) and walk past exhibits (blue) to reach the area where hoofstock are housed. Staff pathways are shown in pink.
- The perimeter of the facility is shown by the yellow line.

Note: in this hypothetical example, the public can interact with susceptible hoofstock along the fence line.

FIGU



RE 5.2: NORMAL OPERATING PROCEDURES

In Practice

When you begin making your map, one of the first things the tool will direct you to do is identify the perimeter of your facility. The tool will also allow you to "pin" a description of the type of perimeter (e.g., high fence, concrete wall) directly on the map. You can then mark parking and exhibit areas and outline pathways for staff and visitors as shown above.

Example: Heightened Risk

Now consider what could be done to protect susceptible species at your facility from heightened risk of FAD? How would you represent this within the mapping tool?

Let's discuss what steps can be taken at various risk levels to help protect the susceptible animals in a collection.

See Figure 5.3 below showing what it may look like if the facility decides to designate the hoofstock area as an **Isolation Area** and suspend viewing and interaction with the Isolation Area to prevent any potential spread of disease.

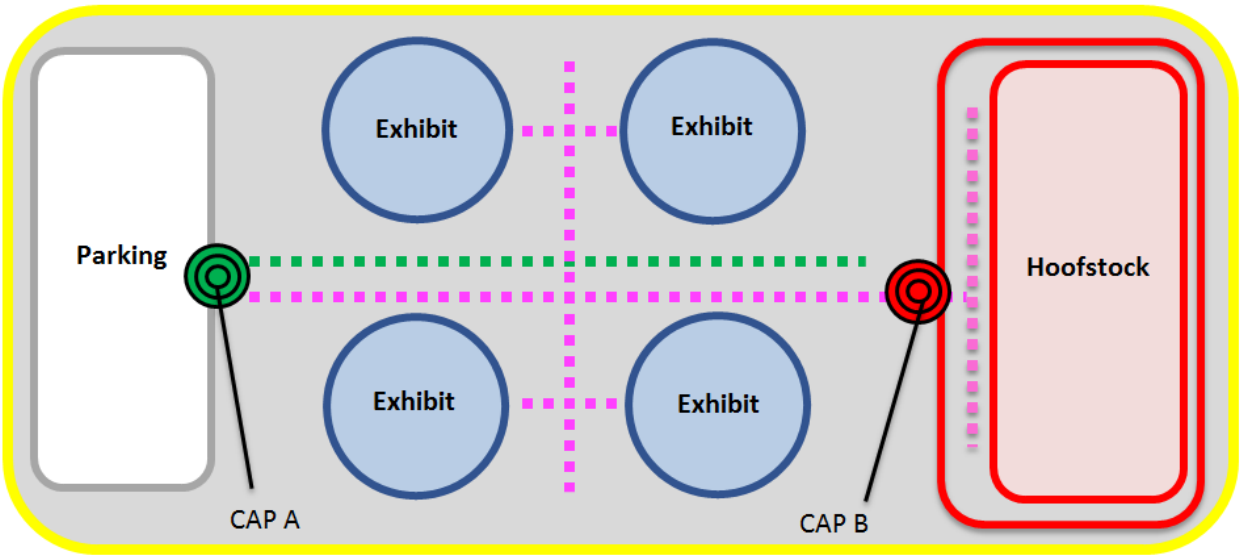


FIGURE 5.2: HEIGHTENED BIOSECURITY

In Practice

In this case you would designate the Isolation Area(s) on your map along with descriptions of when they would be used. In this example, if the SAHO official determines there to be minimal risk, visitation could be allowed to continue as usual with interaction with the non-susceptible exhibit animals (blue) but not with susceptible animals (in this case, hoofstock) in the Isolation Area. If a facility finds itself within a Control Area then that facility would implement the highest level of biosecurity and all visitation could be suspended for the initial investigation phase of the outbreak. The SAHO, would determine when to allow visitation, and determine what areas may be open, likely exhibit areas containing non-susceptible animals.

When using the mapping tool, you will draw the isolation area in red and describe what actions need to be taken by designated personnel at the Controlled Access Point (entrance) to areas holding susceptible animals (in the example, this is the entrance to the hoofstock area, marked CAP B) to get past the established line of separation. Remember, CAP procedures must occur every time a Line of Separation is crossed. Heightened biosecurity protocols at CAPs may include:

- At Level 1 (heightened risk of disease) your CAP may only require footbaths and cleaning/disinfection of equipment. Think about scalability of the biosecurity at each LOS and CAP.
- At higher risk, additional protocols might include:
    - Only specified staff may attend the animals.
    - All equipment used in this area must remain in the area, or undergo extensive cleaning and disinfection prior to removal.
    - Washing stations are to be set up and used before entering and exiting the area.
    - Dedicated footwear and disposable or washable coveralls must be used in the area.

While this example is simplistic, it demonstrates the *process* of developing your plans.

Action Items

Creating your biosecurity planning map

The instructional guide for the Secure Zoo Mapping Tool will walk you through the entire process, including downloading all necessary materials, and utilizing the tool. Don't be intimidated! The guide is very detailed, and even the less tech savvy members of the Secure Zoo team were able to make maps once they completed the downloads and started experimenting with the program.

Before you add details to your map, you will want to consider your facility's layout and the activities that occur at each designated area. Make sure that team members know what species of animals are located in various areas, and that you clearly mark where susceptible species are located, as well as the pathways to those areas, on the map. Remember, the example that was provided above is very simplistic. You may want to consider breaking up areas of your facility into smaller chunks for plan development, determining where LOS may be established and what the CAP protocols would be at various levels of disease risk. Could you close off any part of your facility and still provide a good guest experience? Depending on disease risk, this may be a very viable option!

After your team has considered how your facility may be used, you can begin putting details in your map. Note that your first attempt at developing your plan does not have to be complicated, nor complete. Simpler plans are more easily followed. Consult with your SAHO and your facility veterinarian to get their suggestions for what biosecurity measures should be taken at each CAP, and consider the scalability for biosecurity levels 1, 2 or 3. As your team discusses your facility's biosecurity protocols, you can "pin" these protocols on the map if using the tool developed for Google Earth. If you have already established CAPs, LOS, or other biosecurity protocols in another document, you can refer to sections of those documents within the map itself; just make sure to include any documents referenced if you decide to share your map with your SAHO or others. You may also utilize the Biosecurity Measures Picklist included at the end of this step to track these measures or as a reference to include in other documents.

Sharing plans with your SAHO

Once you have mapped your entire facility and noted features such as the LOS, CAPs, isolation areas, and areas where susceptible species are housed, you will want to share the map with your SAHO. This will give them a real picture of how you will initially secure your facility in the event of a disease outbreak. Your SAHO may have additional suggestions or requirements that should be added to your plans.

Working with your SAHO to get your plans approved before an outbreak will help both your facility and the SAHO in early stages of disease detection. While your facility is trying to implement your plans, the

State and USDA will be extremely busy. They will direct you to make changes as needed, but addressing some of the basics now will better prepare you for early the days of an outbreak. Remember, in the middle of an outbreak, your SAHO will not have time to assist you with planning - they will be responding!

Moving forward

To review, facility biosecurity programs should:

- Define the different levels of biosecurity and how they should be implemented at the facility.
- Standardize the biosecurity measures important to the protection of facilities across all animal industries, as much as is practical.

The ability to adhere to the facility biosecurity plan (and other factors, including progress in controlling/eradicating the outbreak regionally and nationally) will dictate the ability of a facility to resume/conduct animal movements, visitation, and other normal business activities. Thus, the biosecurity measures outlined in the tools and documents within SZS are an integral component to promote business continuity across the industry during disease outbreaks.

The true value in your biosecurity plans is that they give you a place to start. The processes and tools outlined above can be used to determine biosecurity for any number of FADs, though it is important to note that the plan for prevention of FMD will look much different than the plan to prevent another disease, such as Highly Pathogenic Avian Influenza (HPAI). Before giving approval, your SAHO will likely require you to demonstrate your facility's ability to execute your plans, something that will be discussed further in Step 10.

Assessment

Now that you have read through Step 5, it is time to assess your progress.

The following assessment checklist includes a number of tasks that you have already begun or completed in your planning process. Use this assessment to track your progress, record any additional actions that your team is planning to take at each risk level, and take notes on what still needs to be done for Step 5 at your facility.

A final Assessment Checklist will be included in Step 10.

Preplanning

- [ ] Identify and designate a Facility Biosecurity Manager to oversee biosecurity planning and response.
- [ ] Use the "Biosecurity Measures Picklist" worksheet found at the end of this step to select appropriate biosecurity measures to incorporate into your facility plan.
- [ ] Develop a map of your facility using the mapping tool.
- [ ] Discuss and identify characteristics of isolation area(s), if feasible.
- [ ] Discuss and develop Controlled Access Points (CAPs) procedures at different Levels. If you are using the mapping provided with Secure Zoo, you can add these procedures to your map.
- [ ] Identify Lines of Separation (LOS) that can be established and describe how they would be used at different Levels of disease risk. These can be drawn on the map.
- [ ] Discuss and develop vendor biosecurity protocols. Use the Biosecurity Measures picklist as a guide.
- [ ] Discuss and identify appropriate cleaning and disinfection protocols for appropriate disease agents recognized in risk assessment. More on cleaning and disinfection will be discussed in Step 7.
- [ ] Develop standard operating procedures (SOPs) for staff who work with and/or own animals outside of normal business hours (e.g., during HPAI outbreaks, staff may not be allowed to work with poultry or visit areas where they may come into contact with poultry).
- [ ] Work with your SAHO for assistance with identifying appropriate protective measures at all levels, from daily operations to heightened disease risk, with particular emphasis on defining triggers that indicate when stricter biosecurity is needed (see Step 1). Some of this information may already be available in your state's foreign animal disease plans. Review those if they are available.
- [ ] Develop standard operating procedures (SOPs) for staff who work with and/or own animals outside of normal business hours (e.g., during HPAI outbreaks, staff may not be allowed to work with poultry or visit areas where they may come into contact with poultry).

☐ _____

☐ _____

Level 1

These are day-to-day operational considerations that will include increased biosecurity and surveillance measures when an outbreak threatens, but may not be imminent (e.g., an outbreak in a neighboring state or county). This level would include premises in Disease Free Areas.

☐ Attend SAHO and industry conference calls as available and consult your SAHO's website frequently during an outbreak in order to keep up to date on available guidance and epidemiology associated with the disease agent,

☐ Review pre-identified roles and disease-specific responsibilities of your Facility Response Team that you identified in Step 4.

☐ Inventory and test protective and response equipment to determine if additional equipment and supplies are needed during heightened risk levels.

☐ Implement your Level 1 plans and prepare to operate as an At-Risk/Monitored Premises (Level 2) when designated as such by state officials (i.e. in a zone near an outbreak). This should include:

- Implement Lines of Separation. See Secure Zoo Lines of Separation Guidelines and mapping tools in Step 5 for more information.
- Implement Level 1 Controlled Access Points for the access of personnel, vendors, materials, equipment, feed, and other supplies.
- Implement cleaning and disinfection procedures appropriate to facility and level of risk.
- Demonstrate that staff and/or visitors are capable of implementing and adhering to appropriate biosecurity measures for Level 1.

☐ Re-examine risk to the facility and species housed, based on the specific disease agent and its related considerations:

- Reevaluate unintentional human vectors (e.g., staff, visitors, volunteers, vendors) as cross-contamination into the facility from pets, other animals at home, wildlife, or cross-visitation with other facilities.
- Discuss discontinuation of human-to-animal contact (e.g., discontinue petting zoo operations if present) as well as visitor feeding of susceptible collection animals.
- Consider movement of collection animals to more biosecure locations if specified in plan (movement of animals, even within the facility at Level 2 and Level 3 will require approval by SAHO). Assess the need for all animal movements (imports) into the facility. (At Level 3, the facility will be under quarantine, and movement of live animals into the facility will not be applicable.)

☐ Review plans for operating under Suspect or Contact Premises (Level 3) designations. Be prepared in case disease risk increases.

☐ _____

☐ _____

Level 2

These are enhanced measures for uninfected facilities located within a designated Control Area adjacent to an infected premise (i.e., At-Risk and Monitored Premises). ***These are in addition to Level 1 considerations.*** *The SAHO must pre-approve and ensure response plan meets overall response objectives.*

☐ Determine the current objectives of the state and USDA management plans and determine how this affects your Level 2 plans (e.g., early in an outbreak period, response objectives may be to stamp out the disease. If an outbreak is widespread, and past the ability to stamp out, a more managed approach will be taken).

☐ Determine if an Incident Management Team Policy Group has been formed to work through issues that a facility would face if they move from a Free Area to Control Area. Currently, there is a Zoo Unit comprised of USDA and subject matter experts in the zoological field to assist the National Incident Management Team should a zoological facility become involved in a disease response. You can review the Zoo ConOps guide in Step 4 for more information.

☐ If your facility is in a Control Area, ensure that you communicate with your SAHO on any additions or changes regarding acceptable methods and protocols for biosecurity/surveillance not previously outlined in facility planning.

☐ If your facility is in a Control Area, be prepared to provide all of your protective and response equipment **while your premises is negative.**

- *Note: USDA covers the cost of surveillance/sampling diagnostics when a facility is in the Control Area, with or without cost sharing from the state.*

☐ Identify the trained individuals who would serve in support of the SAHO's Incident Management Team (IMT). These individuals would be in a response capacity at your facility and should have completed the minimum training recommended in Step 4 (ICS 100, 200, 700). Your SAHO may require additional training depending on the disease agent (zoonotic disease, such as HPAI, will require staff to have Personal Protective Equipment training).

☐ If requested, the facility should provide a Liaison to the SAHO IMT, as directed by your SAHO/State Response Plan.

☐ Determine if isolation of susceptible species is possible and/or practical. Determine time frames needed for isolation based on incubation periods; recommendations may include doubling the incubation period (e.g., 2 periods of 14 days = 28 days for many viruses).

☐ Review Lines of Separation (LOS) and Controlled Access Points (CAPs). Determine if changes need to be made to increase biosecurity based on heightened disease risk at this Level. Implement your plans that meet with approval of the SAHO for Level 2.

- [ ] Demonstrate that staff and/or visitors are capable of implementing appropriate biosecurity measures for Level 2.
- [ ] Implement additional Level 2 cleaning and disinfection procedures.
- [ ] Implement Vendor biosecurity protocols
- [ ] Recognize that surveillance will take place once you are in a Control Area (more on surveillance is provided in Step 6).
- [ ] Fully understand the permitting process for the movement of animals into or out of Control Areas and Infected Zones. Obtain necessary permits to minimize risk associated with animal movement.
- [ ] _____
- [ ] _____

Level 3

This level indicates the highest level of biosecurity. This is to prevent further disease spread in the collection, or outward from an Infected Premises. ***These are in addition to Level 1 and 2 considerations.*** *These same measures may be applicable for Contact or Suspect Premises until final determination of infection is made.*

- [ ] If your facility is an Infected Premises, ensure that you communicate with your SAHO on any additions or changes regarding acceptable methods and protocols for biosecurity/surveillance not previously outlined in facility planning.
- [ ] Determine the current objectives of the state and USDA management plans, and how this affects your Level 3 plans. (For example, at the beginning of an outbreak, in a small geographic area, stamping out of the disease may be the tactic of choice. However, if outbreaks are prolonged, allowing for recovery following infection, or a vaccination strategy may be employed.)
- [ ] Review Lines of Separation and Controlled Access Points (CAPs). Determine if changes need to be made to increase biosecurity based on heightened disease risk at this Level. Implement your plans that are approved by your SAHO for (LOS) Level 3.
- [ ] Determine the need for additional structural protection (e.g., fences, walls, barriers, distance).
- [ ] Operate under quarantine restrictions (no animal movement) and approved biosecure *human* movements. Business will likely be operated without visitor revenue for the time frame needed to resolve infected status and ensure no further spread through the facility.
- [ ] _____

Notes

Biosecurity Measures Picklist

The following suggestions for biosecurity measures are provided as a resource for facility operators and biosecurity managers. This document serves as a "picklist" to create Controlled Access Point (CAP) protocols for entrance to or exit from the facility, as well as specific areas therein ("Entrance/Exit Rules").

These suggestions are provided to help the biosecurity manager customize not only each entrance/exit (Controlled Access Point), but also to help them strategize about the levels or layers of biosecurity needed as personnel access various areas of the facility. One strategy that may be used when creating a facility map would be to require increasing biosecurity measures the further a person goes into the facility.

Facility operators should work with State Animal Health Officials (SAHOs) to choose which measures must be implemented at each CAP. Consider utilizing this document as a worksheet to note specific details and add agreed upon measures. It is important to note that the timing of implementation of CAPs and protocols will depend on the risk level of a disease.

Potential Biosecurity Measures Required for Staff

All personnel entering the facility will pass through entrances designated as Controlled Access Points (CAPs). CAPs can also be designated at entrances to exhibits to allow for additional biosecurity measures to be taken. The following are biosecurity measures that a facility operator may choose to implement at the **Facility Entrance CAP**, and measures that a facility operator may choose to implement at **Isolation Area Entrance CAPs**. This list is not all inclusive; your team along with your SAHO will help determine what measures are required at each disease risk level.

Upon entering the facility, all personnel will pass through all entrances that are designated as CAPs along the route to the Isolation Area. Depending on a facility's layout and Lines of Separation, operators may require individuals to **repeat** measures previously taken to enter the facility before granting entry to the Isolation Area.

Measure	**Implement at Level**		
To Enter Facility	1	2	3
Notify facility of arrival	☐	☐	☐
Check in at the designated site (Click here to enter text.) or sign in at entrance log	☐	☐	☐
Disinfect vehicle before entering facility (tires, wheel wells, and floorboards)	☐	☐	☐
Disinfect vehicle before entering facility (contaminate/disinfect outside of vehicle/floorboards)	☐	☐	☐
Disinfect equipment before bringing into the facility	☐	☐	☐
Shower before entering facility	☐	☐	☐
Wash hands with disinfectant and use foot bath/decon for footwear	☐	☐	☐
Wear disposable gloves and foot covers/boots (to be provided by facility)	☐	☐	☐
When exiting, dispose of PPE as directed	☐	☐	☐
When exiting, shower and exit using clothes arrived in	☐	☐	☐
When exiting, wash hands with disinfectant and use foot bath/decon for footwear	☐	☐	☐
When exiting, disinfect equipment, repeating same procedures as upon entry	☐	☐	☐
When exiting, disinfect vehicle, repeating same procedures as upon entry	☐	☐	☐
To Enter Isolation Area(s) Containing Susceptible Animals	1	2	3
Check in at the Controlled Access Point/sign in to Entrance log	☐	☐	☐
Disinfect vehicle before entering facility (tires, wheel wells, and floorboards)	☐	☐	☐

Disinfect equipment before bringing into the facility	☐	☐	☐
Shower before entering facility	☐	☐	☐
Wash hands with disinfectant and use foot bath/decon for footwear	☐	☐	☐
Wear disposable gloves and foot covers/boots (to be provided by facility)	☐	☐	☐
Wear addition PPE (Personal Protective Equipment) to protect from zoonotic disease potential (N-95 mask, protective eyewear, other)	☐	☐	☐
When exiting, dispose of PPE as directed	☐	☐	☐
When exiting, shower and exit using clothes arrived in	☐	☐	☐
When exiting, wash hands with disinfectant and use foot bath/decon for footwear	☐	☐	☐
When exiting, disinfect equipment, repeating same procedures as upon entry	☐	☐	☐
When exiting, disinfect vehicle, repeating same procedures as upon entry	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Potential Biosecurity Measures Required for Visitors

Facility operators should choose which of the following measures will be required for visitors to be permitted to enter or exit the facility, or any designated area. Requirements may differ exhibit to exhibit depending on disease, potential animal contact, and other factors. This list is merely provided to your planning team as a starting point for discussion as you develop your specific protocols.

If public visitation is allowed during heightened risk, a facility may designate animal viewing areas with Entrance CAPs where guests would be permitted to enter and observe animals. Some facilities may require that visitors be accompanied by staff to enter this type of area.

Measure	Implement at Level		
To Enter Facility	**1**	**2**	**3**
Notify Exotic Animal Facility of estimated time of arrival (ETA)/permission to enter	☐	☐	☐
No travel to foreign countries in the past 14 days	☐	☐	☐
No travel to disease affected areas (list of areas)	☐	☐	☐
No contact with or visits to farms in the past ___ days (this varies depending on disease)	☐	☐	☐
No contact with wildlife in the past ___ days (this varies depending on disease)	☐	☐	☐
No ownership of susceptible animals as pets	☐	☐	☐
Shower before arriving at facility	☐	☐	☐
Change into freshly laundered clothes (that have been kept clear of contamination since laundered)	☐	☐	☐
Disinfect and package equipment to allow pass through at entrance facility (double bag/box with first bag/box to be removed at pass through)	☐	☐	☐
Assure vehicle cleanliness before coming onto the property	☐	☐	☐
To Enter Animal Viewing Areas	**1**	**2**	**3**
Sign into the visitor log	☐	☐	☐
Formally declare that they have not visited any designated areas (examples could include foreign country, infected state, infected county)	☐	☐	☐
Wash hands with disinfectant (to be provided by facility)	☐	☐	☐
Disinfect footwear (foot bath or spray)	☐	☐	☐
Observe all restrictions (do not feed or throw any objects to animals)	☐	☐	☐
d or drinks allowed into visitor's area	☐	☐	☐

Visitors will be required to be accompanied by staff while in the visitor area	☐	☐	☐
When exiting visitor area, visitors will wash hands	☐	☐	☐
When exiting visitor area, visitors will disinfect footwear	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Potential Biosecurity Measures Required for Vendors

Facility operators may choose any/all of the following biosecurity measures to be completed by vendors delivering/servicing the facility. A Vendor Area and Entrance CAP will be designated within/or near the facility where vendors can deliver.

Measure	Implement at Level		
	1	2	3
Notify facility of estimated time of arrival	☐	☐	☐
Notify facility upon arrival (provide contact information for notification)	☐	☐	☐
Disinfect vehicle before entering facility (tires, wheel wells, and floorboards)	☐	☐	☐
Sign into the visitors log	☐	☐	☐
Declare that vendor/vehicle has not traveled to any designated areas (examples include infected state, infected county, and farms with susceptible animals)	☐	☐	☐
Declare that vendor/vehicle has not traveled to any designated areas (examples could	☐	☐	☐
Wash hands with disinfectant (to be provided by facility)	☐	☐	☐
Disinfect footwear (foot bath or spray)	☐	☐	☐
Wear gloves and footwear (shoe covers or other) upon entering	☐	☐	☐
When exiting vendors area, vendors will wash hands	☐	☐	☐
When exiting vendors area, vendors will disinfect footwear	☐	☐	☐
When exiting vendors area, vendors will dispose of gloves/footwear in designated receptacle	☐	☐	☐
When exiting, disinfect equipment, repeating same procedures as upon entry	☐	☐	☐
When exiting, disinfect vehicle, repeating same procedures as upon entry	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Additional Resources

General

- National Animal Health Emergency Management System (NAHEMS) Guidelines:Biosecurity http://www.cfsph.iastate.edu/pdf/fad-prep-nahems-guidelines-biosecurity
- Zoo Animal Health Network (ZAHN) Influenzas of Non-Domestic Species training https://zahp.aza.org/influenzas-of-non-domestic-species/
- USDA-APHIS Foreign Animal Disease Preparedness and Response Plan (FADPReP) Materials and References https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/emergency-management/ct_fadprep/!ut/p/z1/04_iUlDg4tKPAFJABpSA0fpReYllmemJJZn5eYk5-hH6kVFm8X6Gzu4GFiaGPu6uLoYGjh6Wnt4e5mYGBs6G-l5gjQj9IBPw64iA6oAqh1P6kUZFvs6-6fpRBYklGbqZeWn5-hHJJfFpiSkFRakF-gXZUZEA7fRGiw!!/
- Center for Food Security and Public Health. Resources and disease information by species. www.cfsph.iastate.edu
- Secure Beef Biosecurity Training Materials http://securebeef.org/training-materials/biosecurity/
- Secure Pork Biosecurity Training Materials http://www.securepork.org/training-materials/biosecurity/
- Poultry Biosecurity Resources Poultry Biosecurity Resources http://poultrybiosecurity.org/

Biosecurity Mapping Tool

- Secure Zoo Strategy Biosecurity Mapping Tool Instructional Guide: https://securezoostrategy.org/wp-content/uploads/bsk-pdf-manager/Biosecurity_Mapping_Tool_-_Instructional_Guide_15.pdf
- Google Earth: https://www.google.com/earth/
- Additional downloads (including templates, examples, and custom icons.): https://securezoostrategy.org/facility-biosecurity-mapping-tool/

Step Six

Surveillance

There will be surveillance challenges for Exotic Animal Industry (EAI) facilities during Foreign Animal Disease (FAD) outbreaks. It is likely that typical surveillance methods used by food animal production facilities (e.g., sampling of daily routine mortality that occurs in poultry operations, saliva-based sampling in the swine industry, and milk sampling in the dairy industry) may not be applicable to EAI facilities due to many factors, such as differences in husbandry practices and a lack of test validation for non-domestic species. Understanding the diversity in types of EAI facilities and the challenges mentioned above, Secure Zoo recognizes the value in exploring different surveillance methods to gain health status information of susceptible animals in EAI collections. These methods, used appropriately, would provide regulatory officials with as much information as possible to assess the health status of collections and determine if activities such as animal movements and visitation could occur (all of which may be critical in maintaining the facility and its collection). The information that follows should help both facility managers and State Animal Health Officials (SAHOs) in crafting facility-specific surveillance plans.

Specifics (e.g., timeframes, frequency) for Surveillance Protocols during disease outbreaks will be developed based on Zones and Premises designations used nationally for FAD outbreaks see figure 6.1 below. [29]

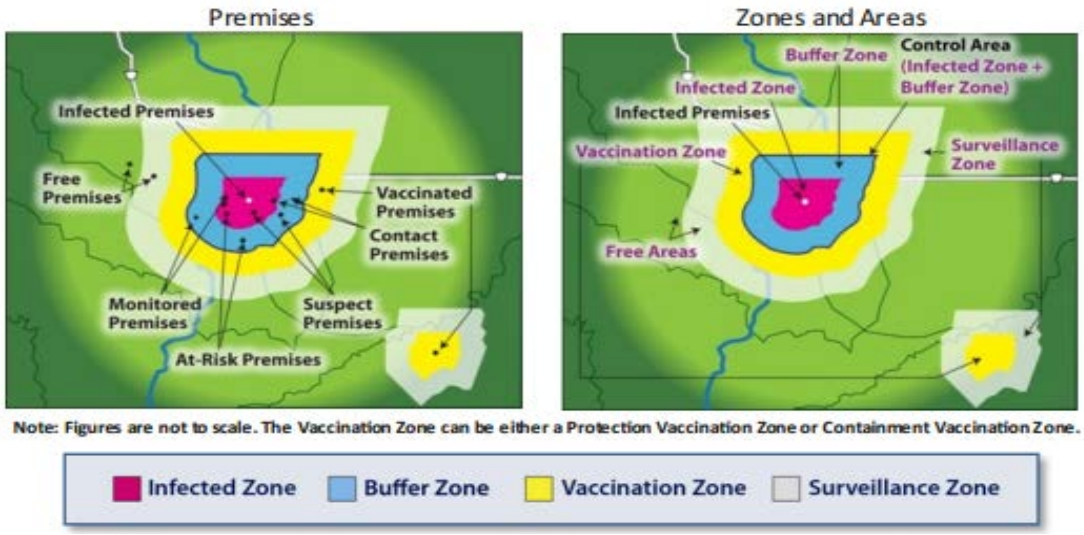


FIGURE 6.1: EXAMPLES OF ZONES, AREAS, AND PREMISES IN FMD OUTBREAK RESPONSE

[29] From Section 5.5.1 of the Redbook Draft Sept. 2014
https://www.aphis.usda.gov/animal_health/emergency_management/downloads/fmd_responseplan.pdf

When an outbreak initially begins, all facilities with susceptible animals within the Control Area (comprised of the Infected and Buffer Zones) will be designated as **At-Risk Premises** and be subject to surveillance. This is a result of being in close geographic proximity to the **Infected Premises**.

- Premises with an epidemiological link to an Infected Premises (and therefore potential exposure to the disease agent) would be designated as **Contact Premises**, quarantined, and placed under surveillance for a set amount of time to determine whether or not the disease agent is present. In the agricultural sector, Contact Premises are often handled quickly to mitigate any possible disease spread. Depopulation of Contact Premises may be swiftly conducted.
- Any premises with susceptible animals exhibiting clinical signs that indicate the disease agent might be present would be designated as **Suspect Premises**, quarantined, and placed under a testing protocol to demonstrate whether or not the disease agent is actually present. Once a Suspect Premises tests negative, it reverts to the designation of At-Risk Premises (if located in a zone). At-Risk Premises that have been assessed and found to have met biosecurity standards and implemented sufficient surveillance testing to allow them to safely return to conducting business continuity activities, such as animal movements or visitation, are **Monitored Premises**.

Response officials will generally request more frequent surveillance for facilities in zones closest to the Infected Premises (e.g., the Infected and Buffer Zones, which together constitute the Control Area). In addition, sampling protocols can be further adjusted for each premises in the zone based on the assigned premises designation. For example, an Infected Zone could require a general sampling protocol of testing samples every third day for At-Risk Premises, whereas the premises designated as Suspect Premises within the Infected Zone may require daily sampling.

Facilities that could be infected (Contact and Suspect Premises) would be expected to have the most time sensitive surveillance protocols, with sampling/testing completed as soon as possible and repeated until the premises status is known. The other two types of premises, At-Risk and Monitored, are also to be tested on a timetable related to the incubation period (this timetable will vary with disease agent and animal species). Monitored Premises may have to undergo additional testing to allow for any permitted activity such as animal movement and visitation.

Surveillance protocols for At-Risk Premises surveillance include observation/sampling at a frequency and level that provides SAHOs and other interested parties confidence that an outbreak in an At-Risk Premises would be discovered before spreading. Most surveillance strategies will begin with At-Risk Premises at a base level, and it is expected that all other facilities will be required to test more frequently either due to risk (Contact and Suspect Premises) or to allow business activities to occur (Monitored Premises).

At-Risk Premises that would like to conduct business continuity activities, such as visitation and animal movements, will need to first achieve Monitored Premises status. To achieve this status, facilities must implement the strictest biosecurity possible and increase surveillance. As response officials specify surveillance parameters for a particular disease outbreak, *surveillance programs for EAI facilities desiring*

a Monitored Premises status will have to meet the needs of that facility and the requirements of SAHOs. For example, a facility desiring to receive visitors each day would likely be required to conduct testing or provide additional surveillance parameters that would assess the facility's daily health status and allay concerns of Federal and State Animal Health Officials (F/SAHOs).

The following chart uses some of the surveillance time frames for recent Highly Pathogenic Avian Influenza (HPAI) outbreaks as examples. Though not disease specific, reviewing it may help Facility Managers understand the frequency and type of surveillance needed for premises and zones.

Sample Surveillance Schedule for Highly Pathogenic Avian Influenza

Note: This chart provides only general illustrations of possible surveillance protocols in the various types of Premises located in the designated Zones.

It is to be used only to understand how a surveillance program for a particular facility might differ as to Zone and Premises designations, and it does not provide surveillance recommendations for any specific disease outbreak.

	Zone Designations		
Premises Designation	**Infected Zone**	**Buffer Zone**	**Free Area**
At-Risk Premises	All premises in the Infected Zone are to be tested within 24 hours or as soon as possible, and then as specified (this may be daily, every other day, or every 5-7 days depending on disease) until the Zone is released.	All premises in Buffer Zone are to be tested within 48 hours and then as specified (this may be daily, every other day, or every 5-7 days depending on disease) until the Zone is released.	Premises with susceptible species in the free zone are not designated as "At-Risk" or "Monitored" but should still be observed carefully for animals showing clinical signs. Response officials should be notified for a FAD investigation if clinical signs appear.
Monitored Premises	Tested as required (e.g., daily) to move animals or allow visitation, as those activities are allowed in the Infected Zone (activities may be restricted for some time at initial outbreak).	Tested as required (e.g., twice within 48 hours of shipment, daily if visitors are allowed) to move animals or allow visitation.	

Contact Premises	Tested when clinical signs are reported, and then likely tested daily until 1-2 incubation periods are past and quarantine on premises is lifted. Upon release, the premises would be designated as At-Risk and undergo surveillance for this designation.
Suspect Premises	Animals showing clinical signs are tested immediately for presence of the disease agent and are released from quarantine if tests are negative. If all tests are negative, the premises would revert to At-Risk designation and undergo surveillance as an At-Risk Premises. If positive, the Suspect Premises would be designated an Infected Premises and Response Zones will be adjusted/created appropriately.

As was mentioned previously, EAI facilities may find themselves struggling to meet the same surveillance protocols set forth for food animal production facilities. This is due to a number of factors, including:

- Difficulty collecting samples without creating stressful and dangerous situations for personnel and collection animals, based on the size and characteristics of the animals and whether they are adapted to human handling on a frequent basis.
- Sampling methods may not be validated for species at EAI facilities.

While discussing surveillance challenges prior to disease outbreaks, it is recommended that EAI facilities consider what a multi-faceted surveillance program might look like. Include discussion of numerous types of surveillance methods and consider how they might be tailored to meet the surveillance goals of response officials as well as the facility's business continuity goals. Remember, test results will likely not be available the same day that samples are taken.

During disease outbreaks, facility managers and staff veterinarians will work with F/SAHOs in their respective states to develop *facility-specific* surveillance plans. These strategies will be constructed for the various FADs based on species susceptibility and other factors.

Surveillance Methods for Exotic Animal Facilities

There are 4 surveillance methods that should be considered for EAI facilities: Active Surveillance, Active Observational Surveillance (AOS), Sentinel Surveillance, and Targeted Surveillance. Not every method will work for every facility or FAD concern, and surveillance during Foreign Animal Disease outbreaks may use all methods in the same facility. When reading through these methods, consider what may or may not work for your facility to monitor for FADs.

Active Surveillance

Active surveillance is essentially a process that actively looks for disease. Many EAI facilities have existing health programs that could be used to bolster surveillance efforts. Yearly physical exams, necropsies, or medical examinations where animals are "in hand" are a great opportunity to sample animals for disease concerns. Necropsies of animals also present opportunities for surveillance. With wildlife populations, active surveillance programs for disease agents such as Chronic Wasting Disease (CWD) require actively capturing a pre-determined number of animals and testing those animals for disease.

Active Observational Surveillance (AOS)

Active observational surveillance (AOS) is an active effort to detect evidence of disease through routine observation of clinical signs. Utilization of AOS may find widespread use by facilities during a FAD outbreak. As testing in this system is prompted by detection of clinical signs, AOS sidesteps the difficulty of performing direct examinations and testing of many animals (at pre-determined study-designed sample sizes) of the animals in exotic animal collections. If performed in a consistent and robust manner, AOS may provide SAHOs with enough information on an exotic animal collection to satisfy the protocols set forth for certain premises (e.g., At-Risk Premises). *Note that AOS is only appropriate for pathogens, host species, age-classes, and situations expected to manifest observable clinical signs following infection. If the population is unlikely to respond clinically to a particular pathogen, or if the clinical signs are unlikely to be easily recognized by an observer, AOS will not provide sufficient assurance of that pathogen's absence or its early detection.* It is imperative to research what species in your collection are susceptible to Foot-and-Mouth or other Foreign Animal Diseases.

In addition to AOS, more in-depth surveillance methods may be required for a facility to be allowed to conduct business continuity activities such as animal movements and daily visitation (i.e., transition from an At-Risk to a Monitored Premises). These methods may include the use of **susceptible domesticated sentinel animals** (domestic livestock or poultry, see Sentinel Surveillance below) that could be more fully and easily examined/tested[30]. In this method, the **sentinel animals** would need to be sufficiently exposed to the susceptible animals in the collection to accurately assess the status of the collection. These sentinel animals could be observed/examined/tested more easily on a daily basis to provide evidence that a disease agent is not present in the collection.

The information below will help facility managers understand AOS more fully, beginning with guidance that provides a basic understanding of AOS used by all the Secure Plans.

[30] Sentinel animals may be impossible to source during a disease outbreak. Movement stand stills, and the risk of possibly bringing the disease agent into the facility via the sentinels, are possible obstacles.

Guidance on AOS

In AOS, the observations must be ongoing and follow a pre-planned schedule, and the observer must be specifically tasked with monitoring for evidence of disease, toxicity, or other causes of mortality and decreased production. Observations, both positive and negative, should be recorded. This observation of animals is considered a screening "test" to look for clinical signs of disease, and animals showing signs of disease would be candidates for laboratory-based testing. These observations of the animal, herd, or flock must occur very frequently (e.g., in commercial dairies, feedlots, confinement swine and poultry active observation occurs once or twice a day). Any observation of clinical signs affecting one or more animals with overt rapidly spreading signs or mortality must be a trigger for further investigation, with established criteria for a response following evidence of an event (e.g., call flock or herd manager if mortality increases beyond a preset percent, call veterinarian if milk production drops below a preset level).

Vesicular diseases, such as FMD, that show overt clinical signs are particularly amenable for AOS in many US animal populations. For example, dairies, feedlots (cattle and sheep), and confinement swine operations have standard management practices compatible with the above criteria, and they already conduct active observational surveillance on a daily basis.

Furthermore, there are a large variety of ongoing activities throughout the US in which animal health officials regularly observe both domestic and wild animal populations for other disease control purposes; these activities could also be used as AOS. For AOS to be utilized, the animals must be able to be observed with regular frequency. Keep in mind that this will be much harder to accomplish in collections with large acreage habitats where sick animals may not be easily observed.

AOS Guidance for Exotic Animal Facilities

Health Monitors (trained personnel appointed to the role of observing susceptible animals for signs that would indicate infection of the suspected disease agent) should use forms for Active Observation that allow them to document their observations and report to the Facility Manager daily, or as directed by the Surveillance Protocol. Specific AOS observations pertinent to exotic animal facility observers (Health Monitors) may include the following:

- Daily observations/documentation of feed and water intake (amounts/duration noted).
- Daily observations/documentation of animal movements, including documentation of distance and ability to move without clinical signs of disease (such as lameness in FMD).
- Daily observations/documentation of usual attendance at places of congregation (e.g., watering holes, shade areas) as well as participation in usual activities (e.g., play, training sessions).
- Daily observations/documentation of overall appearance of health (e.g., no clinical signs of excessive salivation in FMD or respiratory difficulty in HPAI).
- Daily observations/documentation of lack or presence of normal vocalization and social interactions (e.g., quiet birds in HPAI, not "staying with" the herd in FMD).

- Prompt reporting of abnormal findings to owners/operators/veterinarians for follow up.

Development of AOS protocols should include the importance of training the Health Monitors to properly record and report. For more information on Active Observational Surveillance, see the module hosted by the ZAHP Fusion Center on YouTube[31].

Details of the Secure Pork AOS plan may also be useful when developing yours.[32]

Sentinel Surveillance

The utility and possibility of using sentinel species should be discussed with SAHOs. Multiple factors will be considered (e.g., facility location relative to food producing animals). Domesticated livestock or poultry may prove exceptionally useful for implementing surveillance programs for a number of reasons, including:

- Current tests are validated for domesticated animals, but not necessarily for exotics in the collection.
- The epidemiology of the disease (e.g., clinical picture, morbidity, mortality) is more likely to be understood in domesticated animal species than in exotic species, especially early in a FAD outbreak. This is because there are many more food production animals in the US than captive exotics.
- Domesticated animals used as sentinels may be more easily trained to allow for frequent sampling/testing than exotics.
- F/SAHOs have a better understanding of how diseases affect domesticated animals than exotics.
- EAI facilities that house domesticated animals for uses such as petting zoos may find it prudent to discontinue the hands-on contact exhibits, and instead use the petting zoo animals as sentinels for the captive exotic collection.

Domestic sentinels must be susceptible to the disease agent of concern, and ideally they will show clinical signs of disease shortly after exposure to the agent. For sentinels to be considered reliable, the sentinels must have sufficient contact with collection animals to allow for adequate, routine exposure to the infective agent. This should be discussed with your SAHO, but potential ideas include:

- Domestic sentinels share the same water source with collection specimens.
- Manure, bedding, and excess feed from collection animal clean-up is provided to the sentinels to expose them to the agent.
- Staff working with collections must “pass through” an area holding domestic sentinels in their work attire prior to leaving for the day.

[31] This module can be viewed at https://www.youtube.com/watch?v=jSGEfc2B9e0&t=17s
[32] The Secure Pork Supply AOS Plan can be viewed at http://www.securepork.org/Resources/SPS-Active-Observational-Surveillance.pdf

The use of domesticated animals as sentinels would be very useful for sample collection and observation. Your facility should discuss how best to utilize domesticated animals as sentinels with your F/SAHOs. Factors to consider include:

- How well particular domesticated species would serve as sentinels (e.g., cattle would serve as adequate sentinels for FMD, as they are recognized as the "indicator species").
- How sampling schemes being used in other Secure Plans might be adapted and used in conjunction with sentinels (for example, milk samples might be available from sentinels if used as a foster dam or in petting zoo exhibits for the facility).
- The number of sentinels needed will be dictated by the number of exotic animals of interest. The numbers of sentinels needed may exceed additional holding capacity of the facility.

Targeted Surveillance

In targeted surveillance, susceptible animals exhibiting clinical signs would be sampled/tested for the disease of concern using the protocols specified by response officials. Samples may include, but are not limited to, blood/serum, tissue, sputum, saliva, and vesicular fluid. Your surveillance plans should include the protocols for working with SAHOs to conduct investigation/sampling of animals exhibiting clinical signs. Discussing what is possible and practical with your SAHO before an outbreak occurs will highlight the challenges that you may face during a disease event and may make them more willing to think about these challenges and consider different strategies for your specific collection.

Additional strategies for exotic animals and wildlife could be used to augment surveillance programs. Examples include:

- Use of surveillance cameras or other methods to document susceptible animal behavior or activities:
    - Facility staff may find that using surveillance cameras or other methods, such as drones, may prove useful in observing animals within the collection.
    - Cameras that can focus on areas animals frequent can be especially useful. Animal activities can be documented over time to provide an "expected/normal" baseline behavioral pattern, which can then be compared to animal activities during outbreaks.
        - Though not a definitive parameter of health, these observations would be a valuable tool in combination with other parameters, such as food and water consumption.
- **Use of neighboring premises with susceptible populations:** While not ideal for biosecurity purposes, facilities could consider using surveillance results from neighboring domesticated susceptible animal populations to support their status, especially if there is ample exposure between the facility and neighboring animal populations. The neighboring susceptible animals

would need to be exposed in some way to the exotic collection animals via a common water source, or some other direct exposure to provide some measure of confidence in a conferred status. An example might be a neighboring dairy herd sharing a substantial span of fence line, allowing contact with susceptible captive exotics in a collection. Assuming this herd is undergoing surveillance testing, negative results in their sampling could be used to support your facility's disease-free status. Please note that this method can only be used to supplement stronger surveillance measures and cannot be used to confer a negative status on its own.

Surveillance of animals during a FAD outbreak is a critical component of a successful response program. The ability to understand not only where the infection is, but also where it is not, aids in disease eradication and business continuity efforts. Unfortunately, research and approved methods of surveillance on exotic animals are not nearly as developed as those for domesticated livestock. Whenever possible, it is recommended that you consider the use of domestic livestock as sentinel animals, an existing and approved surveillance method familiar to SAHOs, to determine the status of animals in your collection. Further information about surveillance activities can be found in the FAD PReP Surveillance Guidance document[33].

[33] FAD PReP Surveillance Guidance can be found at https://www.aphis.usda.gov/animal_health/emergency_management/downloads/sop/sop_fmd_surv.pdf

Assessment

Now that you have read through Step 6, it is time to assess your progress.

The following assessment checklist includes a number of tasks that you have already begun or completed in your planning process. Use this assessment to track your progress, record any additional actions that your team is planning to take at each risk level, and take notes on what still needs to be done for Step 6 at your facility.

A final Assessment Checklist will be included in Step 10.

Preplanning

- ☐ Review disease susceptibility of species in your collection for Foreign Animal Diseases or other high consequence diseases to understand surveillance needs.
- ☐ Review the surveillance resources in this step as part of your planning process. These are the "playbooks" used by SAHO Incident Management Teams (IMTs), and reviewing them will be valuable prior to discussing possible disease surveillance strategies for your animals.
- ☐ Determine the challenges your facility may have with traditional, hands-on sampling strategies and prepare to discuss with your SAHO.
    - Propose potential strategies to address these challenges.
    - Discuss what resources that might be needed to conduct surveillance. Understand what materials are provided by the Incident Management Teams, and what resources may have to be sourced (capture pens, dart equipment, etc.).
- ☐ Understand the surveillance testing that is performed on domestic species.
    - Though these diagnostic tests are not validated for the use in exotic species, it is recognized that they will still be used. More information on decision-making for the types of tests used for FMD can be found in the NAHEMS FMD Standard Operating Procedures: Surveillance document, page 11[34].
- ☐ Determine if there are susceptible domestic species adjacent to your facility using the map you created in Step 5. Be prepared to discuss with your SAHO how this information may be used to convey disease status at various Premises designations.
- ☐ Discuss the possibility of using Active Observational Surveillance (AOS) for your facility. Review the module in the resources section and customize the AOS form as needed.

[34] The NAHEMS FMD Standard Operating Procedures: Surveillance document can be found at https://www.aphis.usda.gov/animal_health/emergency_management/downloads/sop/sop_fmd_surv.pdf

- [ ] Propose a discussion with your SAHO once you have learned more about domestic animal surveillance and discussed surveillance challenges with your team. This should include:
    - Review of your Biosecurity protocols, using your map and Step 5 plan.
    - Discussion of your facility's surveillance challenges based on susceptible animals in the collection and how they are housed.
    - Presentation of your facility's approaches for surveillance. These approaches may include novel Active Observational Surveillance techniques or the use of domestic sentinel animals within the facility.
    - A discussion of surrounding animal species that may be used as sentinel animals to confer disease status to your facility.
- [ ] _____
- [ ] _____

Level 1

Take these steps if your facility finds itself at Level 1 (disease nearby, but you are currently in a Free Area)

- [ ] Participate in any industry or SAHO calls to determine any surveillance strategies necessary at this risk level.
- [ ] _____
- [ ] _____

Level 2

Take these steps if you are an Uninfected, At-Risk, or Monitored Premises in a Control Area

- [ ] Work with SAHO to meet surveillance parameters, as determined by SAHO and Premises Designation.
- [ ] Determine how frequently samples would need to be submitted to permit business continuity goals.
- [ ] _____
- [ ] _____

Level 3

Take these steps if you are an Infected, Contact, or Suspect Premises

- [ ] Provide surveillance samples according to SAHO protocols.
  - Your facility will likely be closed to visitation (at least for a period of time) with this designation. Surveillance strategies will be determined by disease agent, biosecurity protocol implementation, and other risk factors.
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____

Notes

Active Observational Surveillance (AOS) Form

Facility Name: _____

Health Monitor: _____

Early clinical signs of FMD include the following:	Signs of health (these are activities that document animals are doing their normal routines and seem healthy):
• Fever, death loss (especially in young stock) • Off Feed • Lameness, reluctance to move (some species may not show obvious foot lesions) • Salivation or "smacking" of lips • Blisters or sores on lips, nose, or mouth *	• Normal feed and water intake • Normal movements óñăúúý • Normal social interactions (list):

Date	If any Clinical signs are observed, list here	Is there an alternative explanation for signs observed	List any "signs of health" activities observed	Location of animals

*Sores: The lesions may first appear as white ("blanched") skin in the area where the skin meets the hoof (around the coronary band). Blisters or vesicles more likely form on the coronary band, heel, or space between the toes, but sometimes form on the snout or udder. Vesicles may rupture or hooves may slough off after several days.

Additional Resources

General

- National Animal Health Emergency Management System (NAHEMS) Guidelines: https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/nahems_sur_epi_trac.pdf
- Secure Food Supply: http://www.cfsph.iastate.edu/Secure-Food-Supply/index.php

Training

- Tutorial-based training for FAD disease surveillance and response for exotic animal facilities (including a tutorial on AOS) can be found at: https://zahp.aza.org/influenzas-of-non-domestic-species/

Step Seven

Operations

There are a number of actions (such as biosecurity programs) that a facility will need to implement during an outbreak, whether the facility is infected or not. Effective response operations in infected facilities are critical to disease control as these are actions that will eventually stop an outbreak. **Facility owners and operators can expect that State/Federal Health Officials (S/FAHOs) will provide specific guidance to infected facilities** (this guidance will depend on the scale and scope of the outbreak). However, during the planning process, each facility should discuss how response operations would most likely be carried out at their facility based upon their collection, the composition of livestock in their state, and other factors. During this step, facility owners and operators should discuss the most likely response actions needed during the early stages of an outbreak with their S/FAHOs. Adjustments to the response will likely be made during the disease event as more is known.

Craft a "Managed Euthanasia" and Mortality Management Guide

Depopulation is often used as a tool to stop rapid spread of disease in production animals. This tactic is used frequently in the poultry industry for disease control, but in recent years the automatic decision to depopulate cattle, swine, and other food producing species because of FMD has come into question as a "one-size-fits-all" strategy. Much of the criticism is due to challenges with depopulation and carcass disposal: if a disease were widespread throughout the country or industry, depopulation would not be practical, and properly disposing of thousands or millions of livestock carcasses would be near impossible. Without a disease management strategy, the industry would likely never recover from such an event.

When considering the use of limited euthanasia in disease outbreak situations, Secure Zoo prefers to use the term "**managed euthanasia**" as many of our species will require special considerations, procedures, and equipment if they are euthanized as part of a disease response.

Though it is unlikely that an Exotic Animal Industry (EAI) facility would want to euthanize all of its susceptible animals if infected, managed euthanasia may be needed for severely affected animals or for other disease control reasons. If facility managers and officials agree that certain animals need to be euthanized, then a plan for how this would be best accomplished should be outlined jointly, and in great detail. Potential reasons for euthanasia may include:

- Animal welfare considerations
- Reducing the risk of the disease spreading within the facility or area, thereby reducing the risk of more "valuable" species becoming infected (e.g., managed euthanasia when low conservation value species are infected to help prevent disease spread to endangered species)
- Threat to human health in zoonotic disease outbreaks

Pre-outbreak, facility personnel and SAHOs should discuss what the best methods of euthanasia would be for the various animals in the collection during a disease outbreak. Facility construction, logistics, and species and personnel considerations will all factor into the decision-making process. Most likely, these methods would be the same as those that would be employed for euthanasia needed for reasons other than FAD outbreaks. Important differences to consider would be the potential for larger numbers than customary and proper disposal.

Factors to Discuss with your Planning Team

Your planning team should develop several scenarios pertinent to your facility in order to understand potential challenges with managed euthanasia, and share these challenges with regulatory officials when considering managed euthanasia for disease events. These scenarios could include the need to euthanize different percentages of the animals, movement of animals to a holding area convenient to removal, or euthanasia in the exhibit area of animals that cannot be otherwise moved. Movement of deceased animals for disposal should also be considered.

There are multiple variables that will be considered when discussing managed euthanasia as a disease control strategy. Explore these considerations during your discussion:

- Facility considerations:
    - Does your facility include semi-open range, such as those seen in drive-through safari parks and game ranches? If so, discuss the challenges associated with finding all animals in large enclosures, and the methods that may need to be employed to find/dispatch/isolate-in-place these animals.
    - What supplies that you already have on hand will be needed? Discuss availability of euthanasia solution, appropriate ammunition, etc.
    - What special handling equipment may be necessary (e.g., cattle handling chutes will not be appropriate for many species)?
- Personnel considerations:
    - Has the planning team discussed who would perform the euthanasia procedures? Are they adequately trained to do so? (Realize that the individuals most familiar with handling these animals may be so emotionally invested that it may be psychologically harmful.)
- Species considerations:

- Has your facility discussed the "value" of the species you manage (Step 2)? Are there species that have low conservation value, or are considered "livestock" (e.g., domestic goats)? With certain species, it may make sense to euthanize such animals to prevent disease spread to valuable collection animals, or to speed up the potential for the enterprise to resume normal business operations.
- Are there certain species that have such valuable genetics that every attempt should be made to preserve them?
- Are there animals with such high economic value (e.g., breeding, tourism, hunting) that every attempt should be made to preserve them?

- Other considerations: Given the magnitude and consequences of managed euthanasia, it is imperative that related discussions and decision consider every angle. Mismanagement of the euthanasia process during a disease event could cause a secondary public relations incident, which could adversely impact your business and the industry as a whole. These are just a few of the considerations that may not be readily apparent during your planning process, however, it is critical each is carefully considered:
  - What are the regulatory considerations for the species? Which agencies have oversight over which portions of your collection, and have you engaged those bodies in meaningful discussions about these topics? What are the additional legal implications if it is an endangered species? Owned by another business?
  - Has the documentation surrounding this action for this particular subset of the collection been sufficiently maintained in the event of possible legal action? Can this decision impact any ongoing, pending, or future legal actions (both at this facility and others), and if so, how? Has a risk assessment been made with appropriate action taken to mitigate the most likely avenues opponents may pursue in seeking injunctions? It will be challenging if not impossible to foresee all possible legal challenges, however, it is vital to determine likely scenarios that may delay and/or stop the euthanasia action, thereby possibly putting more of your collection at risk. Ensure your attorney is engaged in all appropriate discussions - and any others for which legal considerations arise for which counsel is advisable.
  - Have all governing bodies been contacted that are involved? This does not mean just those with direct jurisdiction, but indirect as well, such as Board of Directors, Local and Regional Councils, or even Friends of a Zoo organization.
  - How much preparation has gone into handling public notification and the anticipated reaction? How much mitigation can be implemented to reduce negative opinion, which could lead to adverse business and industry impact?

The decision to depopulate any exotic species should be made thoughtfully, after discussing all issues. By discussing this topic with SAHOs and regulatory officials ahead of time, there will be a greater understanding of the issues from multiple perspectives.

The depopulation/managed euthanasia methodology will be decided using subject matter experts and recognized guidance from the following:

- National Animal Health Emergency Management System: Mass Depopulation and Euthanasia Guide[35]
- The American Association of Zoo Veterinarians Guidelines for the Euthanasia of Non-domestic Animals [36]
- The American Veterinary Medical Association's Guidelines for the Euthanasia of Animals[37]

Craft a Disposal Guide for your Facility

If your facility becomes involved with an outbreak, either because it is located in a Control Area or a FAD is onsite, then materials such as bedding, animal waste, and carcasses will need to be disposed of in a biosecure manner. If these materials can be disposed of without leaving the facility, then the disposal plan becomes less complicated. If offsite disposal is required, then additional biosecurity measures would need to be implemented during transport, as well as at the disposal site. SAHOs will be involved in approving disposal methods and permitting the movements of materials in the outbreak zones. Factors to consider as you construct your facility disposal guide include:

- What method of disposal will be used for each type of material?
    - Disposal options include burial, incineration, composting, rendering, and landfill. For each of the materials to be disposed of, especially if the facility has become infected, one particular option may work better than another.
- How and where will material be disposed?
    - If materials are to be moved off site, you may need to have that disposal method approved and permitted by SAHO representatives (the IMT), depending on how the outbreak has affected your facility. It is important to discuss with your SAHO pre-outbreak how you plan to dispose of waste materials and carcasses to make sure your plan fits into the regulatory restrictions that would be in place during the outbreak.
- How will permits for moving the above materials (if needed) be requested and issued?

Factors to discuss with your Planning Team

It is recommended that your team review the Biosecurity Map created in Step 5 and utilize it in discussions regarding disposal. The following should be considered in these discussions:

[35] http://www.cfsph.iastate.edu/pdf/fad-prep-nahems-guidelines-mass-depopulation-and-euthanasia
[36] Available for purchase at The American Association of Zoo Veterinarian's website: https://www.aazv.org/general/custom.asp?page=441
[37] https://www.avma.org/KB/Policies/Pages/Euthanasia-Guidelines.aspx

- Could contaminated bedding, manure, and other materials be temporarily "stored" somewhere in your facility until decisions could be made about decontamination or removal of the material? If so, where?
    - If a temporary storage area for this material is identified, or if materials can be disposed of on the grounds of your facility, then add the location and a description of those areas to your map
- Could carcasses be temporarily "stored" somewhere in your facility until decisions could be made about decontamination or removal? If so, where?
    - If a temporary storage area is identified, or if carcasses can be disposed of on the grounds of your facility, then add the location and a description of those areas to your map.
- If material or carcasses are removed from your facility via a disposal company, determine with your SAHO if the policies and procedures for disposal would remain the same if the material was potentially contaminated with disease-causing agents. Such movements would likely need a permit, and the disposal site would also need to be approved to handle contaminated materials.
- Could materials and carcasses be composted? Composting has become a recognized way of dealing with diseased carcasses, bedding, feed, etc. Discuss the feasibility of composting on site with your SAHO. This will likely be a much more useful tool in rural areas with larger land areas. If composting seems a reasonable tactic, make sure that all state/local environmental regulations support this option. Water tables and waterways must be part of your consideration.
    - You will want to include any composting sites and their description on your map.

Craft a Decontamination Guide for your Facility

Decontamination is a process that includes cleaning equipment, supplies, enclosures, etc., and then disinfecting those surfaces and areas; it is a necessary follow up to destroy any potential remaining disease-causing agents.

Decontamination is a critical part of a biosecurity plan and should be used in facilities that desire to prevent infection as well as those facilities that have become infected. Decontamination of equipment, personnel, or vehicles is important to make sure they do not act as carriers of the disease agent within or away from the facility, and appropriate relevant protocols need to be developed and implemented. In Step 5, you were asked to develop a map and to determine the biosecurity controls needed at each Controlled Access Point (CAP). Critical actions required at each designated CAP will include decontamination. For more information, review the NAHEMS Cleaning and Disinfection Guide. After revisiting the euthanasia and disposal guides you have just completed for your facility, consider whether you need to add any additional cleaning and disinfection information and/or protocols to your plans or map.

Using the resources provided, the planning team and biosecurity manager should work with your SAHO to review the proposed CAP biosecurity protocols and plan for how they would be accomplished. In Step 10, you will evaluate your readiness to implement your protocols.

Factors to Discuss with your Planning Team

The following should be included in discussions regarding decontamination guidelines for personnel:

- Handwashing: Protocols should include length of time for soap contact, drying procedures, and other details. Identify where handwashing protocols/stations should be implemented, both within CAPs and at exhibits/other areas.
- Footbaths: Identify where footbath protocols/stations should be implemented, either at CAPs or within exhibits/other areas.
- Personal Protective Equipment (PPE): Protocols for wear, cleaning, and disinfection or disposal of PPE, such as footwear and gloves, should be developed.
- Showering: Requiring personnel to shower before entering or exiting designated areas is an important step used in production animal facilities. Identify those CAPs where a shower would be necessary to pass through. During heightened disease risk, shower protocols may be in place to enter the facility, and they may also be used when entering high biosecurity areas such as the isolation areas. Showers would also likely be needed when exiting any facility where infection is located.

The following should be included in discussions regarding cleaning and disinfection guidelines for vehicles:

- Discuss how and where facility vehicles should be decontaminated based on the functional area(s) and CAP(s) they will access..
- Discuss how off-facility vehicles enter the facility. Detail how and where these vehicles should be cleaned and disinfected, based on the functional area(s) and CAP(s) they will access.

The following should be included in discussions regarding cleaning and disinfection guidelines for equipment and facilities:

- Discuss decontamination of equipment, walkways, and other features for each area of the facility. Consider the type and frequency of decontamination that would be required, as well as how decontamination equipment would be positioned and stored.
- Discuss challenges of decontamination of various exhibits. Pastures, paddocks, exhibits, and other areas that cannot be easily or reliably decontaminated are often left fallow for extended periods of time.

Assessment

Now that you have read through Step 7, it is time to assess your progress.

The following assessment checklist includes a number of tasks that you have already begun or completed in your planning process. Use this assessment to track your progress, record any additional actions that your team is planning to take at each risk level, and take notes on what still needs to be done for Step 7 at your facility.

A final Assessment Checklist will be included in Step 10.

Preplanning for Facility Managed Euthanasia Guide

- [ ] Document which species you manage that should be spared if at all possible (Step 2, Understanding Your Facility's Business Model).
- [ ] Document which species are of low conservation or monetary value (Step 2, Understanding Your Facility's Business Model). The ability to return to normal business more quickly may make euthanasia of these animals a practical consideration.
- [ ] Discuss potential legal implications with managed euthanasia of species. Understand what regulatory agencies may need to be involved in the decision-making process based on species.
- [ ] Review the NAHEMS: Mass Depopulation and Euthanasia guide in the Resources section of Step 7.
- [ ] Discuss and document challenges associated with finding all animals in large enclosures (e.g., drive through safari parks, conservation centers).
- [ ] Discuss/determine what euthanasia supplies are kept on hand. Discuss availability of euthanasia solution, appropriate ammunition, and/or materials that have limited access or that have special requirements to obtain.
- [ ] Determine any additional special handling equipment that may be necessary for managed euthanasia.
- [ ] Discuss and document the training that your staff has completed/needs to carry out for various euthanasia procedures (e.g., the facility has veterinary support and expertise with the affected species to administer euthanasia solution, or, the game ranch has access to sharp shooters for expansive areas).
- [ ] Facility will discuss strategies for disposition of infected/exposed animals with the SAHO.
- [ ] The approved plan will be implemented for animals that require euthanasia due to animal welfare, to halt disease spread, and for those that pose a critical risk to collection
- [ ] _____
- [ ] _____

Preplanning for Facility Disposal Guide

- [ ] Review the National Animal Health Emergency Management System (NAHEMS): Disposal Guide in the Resources section of Step 7.
- [ ] Discuss and document what types of material may become contaminated by diseased animals. This would include bedding, manure, unused feed, contaminated water, etc.
- [ ] Consider disposal of contaminated materials and carcasses:
    - Discuss and document current disposal methods. Recognize the biosecurity risks current disposal methods may pose.
    - Determine if there are any appropriate areas on grounds for composting. This option is more appropriate for rural or expansive areas.
- [ ] Determine any appropriate areas on grounds where contaminated materials or carcasses may be *stored* temporarily until IMT determines the most appropriate disposal methods.
- [ ] Determine water run-off patterns that may affect disposal options. Consider discovering the location of water table depth, which may automatically rule out disposal options, such as burial on grounds.
- [ ] Implement the disposal plan as approved by the IMT.
- [ ] Discuss with SAHO the draining of ponds to discourage wildlife for diseases where wild birds act as reservoirs. (The value of draining the ponds and the ability to actually do so should be part of this discussion. Environmental impact from pond drainage/disposal of sediment and risk of spreading disease are some of the considerations.)
- [ ] Consider and discuss appropriate wild animal and scavenger protocols, as well as necessary rodent and insect control programs. Any disposal areas, temporary or permanent, will require strict vermin control programs.
- [ ] _____
- [ ] _____

Preplanning for Facility Decontamination Plan

- [ ] Review the National Animal Health Emergency Management System (NAHEMS): Cleaning and Disinfection Guide in the Resources section of Step 7.
- [ ] Review your standard operating procedures and biosecurity plans to determine how effective they would be should the facility become infected.
- [ ] Review Controlled Access Point (CAP) procedures (Step 5, Biosecurity Program and Map) to determine if they are adequate to operate as an infected facility.

- [ ] Discuss Personal Protective Equipment (PPE) needs for personnel during cleaning and disinfection activities during an outbreak.
- [ ] Discuss personal hygiene actions that may need to be altered (e.g., increased handwashing).
- [ ] Develop a cleaning and disinfection equipment inventory (e.g., hand sprayers, decon agents, foot baths, power washers and other equipment). Establish scheduled equipment checks to ensure they are in good working order.
- [ ] Discuss the challenges of decontamination of objects that cannot be thoroughly cleaned prior to disinfection. Dry lots, grassy exhibit areas, wood, etc. are difficult to clean thoroughly prior to disinfection. Be prepared to discuss these concerns with your SAHO and the IMT.
- [ ] Identify where it may be possible to disinfect vehicles prior to them entering the facility. The final location of these wash areas will be determined by the IMT's final plan, but considering acceptable sites as part of the planning process may speed up response time.
- [ ] Implement the Decontamination plan approved by the IMT
- [ ] _____
- [ ] _____

Notes

Additional Resources

General

- NAHEMS Guidelines: Mass Depopulation and Euthanasia https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/mass_depop_euthan.pdf
- NAHEMS Guidelines: Disposal https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/disposal_nahems.pdf
- NAHEMS Guidelines: Cleaning and Disinfection https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/cleaning_disfection.pdf
- AVMA Guidelines for the Euthanasia of Animals https://www.avma.org/KB/Policies/Pages/Euthanasia-Guidelines.aspx

Step Eight

Media and Communications

A Foreign Animal Disease (FAD) outbreak impacting an Exotic Animal Industry (EAI) facility would likely create a great deal of interest from patrons, industry partners, and the public. Working with State Animal Health Officials (SAHOs) to help develop shared media and communications plans is a critical preparedness step for any facility. A media plan covers what a facility would tell the public, EAI community, and patrons; while the communications plan will dictate the methods and means a facility will use to communicate with key parties, such as facility personnel, vendors, SAHOs, and other industry participants during an outbreak.

Creating Media and Communications Plans

In Step 7, you discussed possible response operations for your facility in the event of an outbreak. Now that you have a basic idea of what your facility will attempt to do in an outbreak, it is time to develop media and communications Plans.

Media Plan

Your media plan will address how you would convey appropriate messages through a variety of routes and communication methods. SAHOs will have access to Public Information Officers (PIOs) who specialize in outreach and may be able to assist your facility. Media messages should be developed in consultation with your SAHOs, their PIOs, and your management staff, and they should be prepared and vetted in advance whenever possible. Remember, in a coordinated response it will be important to ensure your messaging is consistent with that of the Joint Information Center (JIC). Your SAHO will give you information on how to receive this messaging in such an event.

It is recommended that whoever is chosen to speak with media on behalf of the facility consider media training. While there are courses in media training available, some role playing and a simple video camera can also go a long way in helping prepare as practicing and reviewing a “performance” can give a person more confidence in front of cameras during a real event. Just because someone is an expert with animals doesn’t mean they will be an expert in front of the media, so a little practice goes a long way. Of utmost importance, make sure that staff is trained to direct the media to the facility PIO or designated spokesperson for any information. The media has been known to ‘ambush’ employees with questions about the incident. They should know how to address the media to the proper individual(s). “No comment” is not a good reply. Direct them to the right person!

Finally, it is always a good idea to develop a relationship with local media prior to any sort of incident at your facility if at all possible. This relationship may prove to be very important during an incident.

Communications Plan

The communications plan contains the "who, what, where, when, and how" of conveying information. The plan will provide the details of the contact information of who you will want to communicate with, and the methods of how you will contact them. Vendors, service providers, and even your staff/volunteers need to be included in your communications plan. You may use email, phone, texts, social media or other means of contacting the various people who need to know important information concerning your facility during an outbreak. Your facility communications plan should identify who needs to notified, when notification should occur, what needs to be communicated, and how it would be communicated based upon the type of incident. Keep in mind that an effective communications plan will utilize multiple platforms, targeted to deliver the most effective message.

Examples of information in your communication plan could involve the following:

- Staff/volunteers:
    - Who should be the "voice" of the organization to staff and volunteers?
        - This may change depending on the type of incident. (e.g., during a disease event, the veterinarian may be the best person to communicate to staff. For other incidents, the facility owner/operator may be the best choice.)
    - What information will be included?
        - Basic information about the incident, work schedules/protocols/map reflecting different protocols
    - How will this information be communicated?
        - Phone/text/email
- When will communications be sent?
    - Pick the best time for each message and consider how often messaging needs to be repeated.
- Vendors:
    - Who should speak with vendors on behalf of the facility?
        - It is helpful to have someone with a relationship with vendors assist with this communication? They understand the standard operating procedures for deliveries, etc.
    - What information will be included?
        - Instructions/map/schedules/protocols that reflect increased biosecurity measures
    - How will this information be communicated?
        - Phone/email/fax
    - When will communications be sent?

        - Pick the best time for each message, and how often do you repeat?
- Visitors
    - Who should craft communications for visitors?
        - Many facilities that exhibit animals has someone that manages promotions, social media content, web page content, etc. Consider their experience when crafting the messages that would be shared with visitors.
    - What information will be included?
        - Changes in visitation policy, and/or questions directly pertaining to animal health and welfare during an incident.
    - How will this information be communicated?
        - Media/social media
    - When will communications be sent?
        - Pick the best time for each message and determine how often information should be provided to visitors and public.
    - *Note: Messaging for non-English speakers is critical to keeping the public well informed in general. In a zoonotic event the need becomes an even greater priority.*

Assessment

Now that you have read through Step 8, it is time to assess your progress.

The following assessment checklist includes a number of tasks that you have already begun or completed in your planning process. Use this assessment to track your progress, record any additional actions that your team is planning to take at each risk level, and take notes on what still needs to be done for Step 8 at your facility.

A final Assessment Checklist will be included in Step 10.

Preplanning

- ☐ Read through the FMD Ready Reference Guide in the Resources section. This is an excellent reference to learn more about the "process" that should be considered when communicating about a foreign animal disease (FAD). For more detail, review the Highly Pathogenic Avian Influenza Standard Operating Procedures: Communications[38]. This communications plan was recently "tested" during the avian influenza outbreaks of 2014-2016. Think about similarities or differences in the plan for a FMD or other FAD event.
- ☐ Review the Media and Communications Quick List for tips on media and communication with insights into the various audiences you may need to reach in a disease event.
- ☐ Understand how to find information about disease outbreaks in your state by locating and periodically reviewing disease information on your State Veterinarian's webpage.
- ☐ Request participation on any list servs, conference calls, or other industry information on disease issues hosted by your SAHO
- ☐ _____
- ☐ _____

Media Preplanning

- ☐ Determine who will serve as the PIO for your facility.
- ☐ Set policy for who is able to speak with the media. Consider role playing with staff, including scenarios that feature intense lines of questioning.
- ☐ Develop messaging templates that can be modified by disease and consider how they can be tailored to each stakeholder group.

[38] https://www.aphis.usda.gov/animal_health/emergency_management/downloads/sop/sop_hpai_communications.pdf

- [ ] Develop a social media policy for staff. Determine basics of what should and should not be shared unless it is an official posting from authorized personnel.
- [ ] Designate someone to monitor and/or proactively communicate via social media. This can help inform the public, dispel rumors, and notify changes that may affect visitation at various premise designations.
- [ ] _____
- [ ] _____

Communication Preplanning

- [ ] Develop Contact lists for communications. Designate someone at your facility to keep these updated.
- [ ] Identify the internal stakeholder groups at your facility. The larger the facility, the more groups you will likely have. This may include staff, volunteers, interns, docents, and donors.
- [ ] Develop a facility (in-house) notification plan for time sensitive messages for employees and vendors.
- [ ] Determine what methods you will use to communicate with each stakeholder group. Options include meetings, texting, emails, conference calls, letters, and social media platforms.
- [ ] Determine who has responsibility to reach out to vendors at heightened risk of disease. Formulate a list of questions that could be asked to help assess the risk of possible infection transmission (See Step 3, Risk Assessment)
- [ ] Determine who has the responsibility to reach out to external stakeholders such as county extension, county (or local) emergency management, neighbors, and other businesses.
- [ ] _____
- [ ] _____

Level 1, 2, or 3 of heightened disease risk or infection

- [ ] Review any contact lists that were developed in the planning process; update as needed.
- [ ] Ensure that the SAHO has entered any pertinent information about your facility into databases or communications chains in disease events.
- [ ] Provide a facility Public Information Officer (PIO) to the JIC as requested.

- [ ] Ensure that there is connection to the Joint Information Center (JIC) for development of appropriate messaging.
- [ ] Discuss how employees will use the facility's website, social media, and other communications channels to educate public/visitors on any changes to visitation policies or to provide other informational updates.
- [ ] Create content that is consistent with the facts being shared by SAHOs and the JIC for the facility's website, social media and other communications channels.
- [ ] _____
- [ ] _____

Notes

Additional Resources

General

- USDA Foot-and-Mouth Disease (FMD) Response, Ready Reference Guide – Communications https://www.aphis.usda.gov/animal_health/emergency_management/downloads/fmd_rrg_communications_plan.pdf
- Zoo Best Practices Working Group (ZBPWG) Communications Annex http://zahp.aza.org/wp-content/uploads/2015/06/Communications_Annex.pdf
- ZBPWG Communication Modalities Chart http://zahp.aza.org/wp-content/uploads/2015/06/Communication_Modalities_Chart.pdf

Step Nine

Recovery

The response to a Foreign Animal Disease (FAD) refers to the measures taken to combat the disease, such as managing infected animals, and cleaning and disinfecting materials and the environment. Think about recovery as the efforts taken to get your business to a new 'normal'. Recovery efforts for a national FAD outbreak should begin in the initial phase of response, and they will be continually redefined throughout response and the recovery period. The impacts of an outbreak will be felt across the country for years, even decades, depending on the size and scope of the outbreak. Recovery goals for Exotic Animal Industry (EAI) facilities include protection of staff health, preservation of the collection, and preservation of the facility business model. By completing Steps 1-8 and discussing potential options with SAHOs, facilities can understand how to develop response capability and identify the equipment/personnel needed to successfully prevent or respond to a FAD outbreak. Without response capability and capacity, recovery will be difficult, if not impossible.

The consequences of an outbreak depend on its type, duration, and whether the geographic scope is local, state, regional, national, or international.

Throughout this strategy, we have already discussed a number of steps the EAI can take to work towards preventing disasters from affecting facilities and mitigating effects of outbreaks that do occur. Measures include:

- Maintaining epidemiologic situational awareness and being ready to respond immediately to a potential outbreak (See Step 1).
    - *Note: it cannot be overstated that connectivity with your SAHO and other response agencies is the best way to get accurate, up-to-date information about disease issues in the US, your state, and your area .Establishing working relationships with local Emergency Management and Public Health, State Animal Health Officials, and Animal Emergency Preparedness programs (See Step 2).*
- Educating and training on biosecurity and disease transmission across all entities engaged in the community, including breeders, rehabilitators, domestic and international animal transporters, and those that facilitate animal movement within the existing community.
    - Consider participating in training and education opportunities with agricultural entities or animal production centers in close proximity to the facility (See Steps 3 and 5). These may be made available by local Cooperative Extension Programs or agricultural trade associations.
- Identifying and training personnel for response teams (See Step 4).
- Identifying safe locations for possible movement of animals into isolation (See Step 5).

- Seeking the latest information on vaccination plans or policies for species at your facility (See Step 7), and assigning personnel to monitor websites for your State Animal Health Official and USDA APHIS.

However, despite taking all of these preventive measures, there is still a chance that a facility may be infected by a Foreign Animal Disease. This is why planning for recovery is so important.

Planning for Recovery

A fundamental concept in the management of any incident is that recovery begins on Day One. This is true in disease outbreaks as well. Recovery is the ability to emerge with a viable and sustainable business model after an event. Facilities have to plan for recovery as quickly as possible because they are dependent on visitation, education, shared breeding programs, and maintaining the confidence of their donors to protect and preserve species of animals in their care.

The EAI is comprised of a wide scope of business types. Facilities have different operational models, fiscal soundness, and overall capacity. This means there is extreme variability in resiliency across the industry.

Consider some of the following consequences of a FAD outbreak affecting your facility, and what the long-term effects would be. In addition to potentially losing your business, your facility could experience:

- Loss or injury to species due to direct infection
    - If this occurs will there be replacement animals? Small populations may be impossible to replace.
- Impact on the movement of loaned or traded animals, and potentially a reduction in their valuation.
    - If an animal is allowed to “recover” from disease, can it ever be moved again? Bred again? These answers are unknown at this time.
- Restrictions on visitation
- Reduction in income
    - Loss of donors, investors, and/or visitors
- Loss of trust/negatively impacted perception
    - If visitation and exhibition are part of your model, expect that the public may avoid or blame you for the outbreak.
    - Within the industry regarding your facility’s ability to preserve and manage wildlife
- Loss of staff, volunteers, and Board Members and with them, their knowledge/skills
    - If jobs are in jeopardy or staff cannot work for several weeks due to recovery efforts, can you redefine positions, at least temporarily?
- Negative media

    - Rogue bloggers, artificial news, or inflation of issues
- Liability issues
    - Workers (e.g., health related); animals (e.g., if an animal belonging to another entity is euthanized because of disease); vendor contracts
- Increased insurance costs

Planning for recovery ahead of time is critical in enabling you to:

- Fulfill your facility's "mission."
    - If conservation is important for your facility or brand, preservation and/or continued breeding of your animals will be a benchmark for recovery.
- Preserve & protect the individuals and species in your care.
    - If a disease is zoonotic, recovery plans should be very clear on how staff will be protected as they work toward returning the facility to a "new" normal.
- Instill guest/donor/investor confidence.
- Maintain the reputation of the facility within the industry
    - Confidence of fellows in the zoo community who share animals for breeding or education. A lack of recovery capacity may be interpreted as indicating other problematic shortcomings.
- Allow for accurate media portrayal.
    - Facility Public Information Officers (PIOs)/spokespersons should be prepared to address questions about what the recovery plan is; this will be of intense interest. Be prepared to defend the plan.
- Retain staff.
    - Staff will undoubtedly be under stress during an outbreak. They must understand the recovery plan direction for buy in. This may help with staff retention during recovery, which may be essential for business continuity.

Considerations for Drafting Recovery Plans

During the development of your Secure Zoo Plan, consider what recovery for your facility might look like:

- What are your overarching goals for recovery?
- What do you need in order to reach these goals?
- What resources are available to help you achieve these goals?

There are likely many possible scenarios, but your personnel should be informed about the possible recovery objectives. By talking through scenarios, this may highlight some training needs for staff to respond/recover and identify gaps in the plan. Consider the following to determine your needs during recovery:

- **Personnel**
    - Understand and include worker liability issues/OSHA requirements when drafting plans. If your facility has union employees, the planning team should also have an understanding of limitations that may exist for union members during response and recovery operations.
    - Consider general staffing needs during recovery
        - Staffing will likely be an issue for any facility involved in a protracted 24/7 response. While larger facilities may have the manpower to support and recover from an outbreak, depending on the scale of the outbreak and impact to the animals, smaller facilities will be limited in their ability to keep workers functional for long activations.
    - Specialized staff needs
        - Do you have enough trained veterinary and animal care staff to meet recovery needs?
- **Financial**
    - What are your financial needs during recovery and how can you return to normal business operations?
        - If your facility is reliant on visitation as part of the business model, include any findings from discussions with Public Health and Emergency Management recovery experts on allowing visitation as soon as possible to areas not affected or for diseases with no consequence to humans.
        - Make sure you understand insurance coverage, your ability for short and long-term borrowing, eligibility for Small Business Administration (SBA) loan programs, and potential support from donors and patrons.
- **Media and Communications**
    - In the recovery phase, media preparations will be important in terms of coordinating messages for the various facilities that make up the EAI and interested parties. A facility's affiliation, size, funding, staffing, and rapport within the community all affect the ability to maintain a high level of coordinated communications.
    - Include plans for media, such as guidelines for accurate reporting, how to demonstrate to the public what is going "right" with the response and recovery, tested messages, and pre-approved message templates that include the whole community. Keep messaging consistent with Joint Information Center (JIC) information as part of the Incident Command System (ICS). Include talking points to be shared across the community when appropriate.
    - Train your staff on how to appropriately manage confidential information, and how to direct inquiring public and media to the one source with authority (your PIO or spokesperson) that can speak on behalf of the entire facility.
- **Partnerships**

- Establishing connections with state and local government, as well as within the industry before an outbreak will be a great advantage when it comes to recovery.
- Make connections with your state and local governments to ensure that your facility is considered during risk and mitigation planning. This necessitates that they know you are a relevant entity (e.g., Premises ID numbers, previous relationship building).
- Once your preparedness plans are developed, consider asking your SAHO if you may observe or participate in a state FMD exercise. This is a fantastic way to better understand the response/recovery process and will highlight areas for improvement in your plans.
- Identify experts from the exotic animal, regulatory, or animal emergency management communities that could assist your facility with recovery efforts, even if they may not be able to assist with the FAD event itself. Consider:
    - Collaborations, such as National Animal Rescue and Sheltering Coalition (NARSC)
    - Zoological and exotic animal industry groups, such as Association of Zoos and Aquariums (AZA), Zoological Association of America (ZAA), Exotic Wildlife Association (EWA), and American Association of Zoo Keepers (AAZK) and the Global Federation of Animal Sanctuaries (GFAS).
    - Individuals with specialized skills, such as wildlife specialists and rehabilitators

Know your Resources for Disease Recovery

In addition to supplies needed for recovery, a cadre of professionals may provide excellent recovery advice. When considering what recovery may look like, think about what outside personnel resources may be available. This could include:

- General staffing support
- Veterinarians and other medical specialists, either from response agencies, or colleagues who could assist in times of disease outbreaks.
- Animal management/handling personnel.
    - Are colleagues available or will they be allowed to assist as an official responder?
- Communications and media specialist (See Step 8)
- Business and finance specialists who can help advise you during the recovery process.

Financial

If an affected EAI facility is publicly owned and the disaster is federally declared, FEMA may be able to assist with facets of the recovery process. In this case, performing a damage assessment with knowledgeable staff and other experts will be an important first step, and it will require a state-level emergency manager's expertise and assistance. However, you must ***not*** **count on FEMA for assistance in FAD response, as there is no precedent for receiving assistance through the Stafford Act for a FAD event.**

Fundraising

During recovery, fundraising may represent a critical revenue stream; however, it must be noted that this funding source will be heavily reliant on public and stakeholder perception, and any number of factors could adversely impact giving patterns. This must be accounted for when determining the level of reliance to place on fundraising as part of an immediate and longer-term recovery strategy. Consider the following:

- Is your facility a non-profit (stand-alone and affiliated with public/private)?
    - This avenue is available mainly for non-profits, though in disaster scenarios, people often give less discriminately, meaning there may be enhanced willingness to give to operations that are not non-profit and therefore cannot offer tax deductibility of contributions..).
- What is your existing donor base?
    - Ability to fundraise effectively will be heavily dependent on pre-existing networks that have been developed. New funders may step forward in a disaster scenario, but especially in a situation where a swath of the community may be impacted, your disaster may not be the most compelling.
- How much media coverage do you anticipate?
    - The extent of media coverage could heavily determine whether a fundraising campaign in a disaster is successful.

Insurance

There are many types of insurance available to exotic animal facilities, though it is important to note that disease events are not typically included in normal coverage. Because of differences in coverage between providers, owners/operators should arrange a discussion with their insurance companies to understand what is covered. Considerations include:

- Animal mortality coverage within a collection (% covered)?
    - How many institutions generally carry any of these policies?
    - Accreditation appears to be a determining factor for some carriers regarding willingness to insure.
- Whether coverage for disease events is generally covered under the available policy types
    - Past communications with large insurers in the industry have indicated that coverage for disease events is unusual, and will often require an insurance rider and higher premiums.
- Small Business Administration (SBA)
    - Most zoos will fall under SBA's purview, and therefore may have access to their disaster loan program in the event of a qualifying incident.

Review and Revise

As the FAD event unfolds, it is important to review your goals and objectives to make sure you are still on the best path forward. Media and communications templates should also be revised throughout recovery.

Assessment

Now that you have read through Step 9, it is time to assess your progress. **This step may seem to be the most "difficult" to plan however; having a basic understanding of the path forward will make it easier to add details as needed to speed your Recovery process.**

The following assessment checklist includes a number of tasks that you have already begun or completed in your planning process. Use this assessment to track your progress, record any additional actions that your team is planning to take at each risk level, and take notes on what still needs to be done for Step 9 at your facility.

A final Assessment Checklist will be included in Step 10.

- ☐ Consider what the facility's goals may be in recovering from a catastrophic event due to disease or disaster.
  - For example, if a collection is highly susceptible to catastrophic diseases such as FMD, would the facility consider changing its collection plan to species not susceptible to catastrophic disease?
- ☐ Determine how much money is in reserve to operate the facility while it remains closed to visitation. Share during earlier stages of planning with regulatory partners.
- ☐ Make sure management can provide accurate information about potential financial borrowing capabilities.
- ☐ Understand facility insurance coverage. Include the following
  - Loss of animals due to disease
  - Loss of revenue (business continuity insurance)
  - Unemployment compensation (understand coverage if staff has to be temporarily laid off of released)
- ☐ Recognize the facility's eligibility for FEMA support for disease or disasters. Currently, FEMA has not provided reimbursement for disease events. However, for natural disasters, depending on your business model, you may be eligible for FEMA programs.[39]
- ☐ Determine who at the facility might be responsible for donor outreach and fundraising during financial hardship.
- ☐ Identify colleagues in the industry who have been through a recovery process. Document the lessons learned that could make your recovery more successful.
- ☐ Consider participating in state-level disease response and recovery exercises to test your plan, determine gaps, and learn from agricultural partners about recovery issues.
- ☐ Review the goals and objectives of recovery. Are they still consistent and achievable?

[39] Secure Zoo recommends that during discussion with your local Emergency Manager you determine FEMA eligibility for various programs.

- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____

Notes

Step Ten

Facility Assessment

Facilities that have completed the previous steps should now have a Response Plan, but there is still one important step remaining. As mentioned earlier, the planning process is more important than the plan itself. Creating a plan is a huge accomplishment, but having everything down on paper is very different than executing a plan. Facilities should assess their readiness by taking the time to:

- Review plans and determine gaps and areas for improvement
- Train employees to the plan
- Demonstrate the ability to implement the plan
- Determine timetables for plan review

This step will provide facilities with the opportunity to review their plans using a master checklist to help identify and address gaps. The checklist is arranged in levels depending on the risk to a facility and the proximity of the outbreak to the facility at the time:

- Level One: FMD has occurred nearby (a trade partner in the county or state).
    - This basic level of preparedness may also be considered if a high consequence disease such as FMD is detected regionally.
- Level Two: An outbreak has occurred, and your facility is located in a Zoned Area[40].
- Level Three: Facility has experienced a disease outbreak, has been exposed, or has animals showing suspicious signs.

A brief or an executive summary of your assessment could be used to update a governing board, senior staff and other decision makers. These individuals will need to understand the flow and potential consequences of an outbreak, but they may not be involved in the operational details.

Assessing your Facility's Readiness

You've completed the previous steps to build your Facility Response Plan, and you are now ready to assess your facility's readiness.

In this step you will do a "walk through" of your facility's response readiness by working through the **SZS Facility Assessment Checklist**. The checklist is a basic list of the activities that a facility should be able to

[40] See step 5 for more information about zones, or view the page 54 of the NAHEMS Biosecurity Guidelines at https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/fadprep_nahems_guidelines_biosecurity.pdf

perform or implement in the event of a disease outbreak. All of the activities listed are ones you already worked on in earlier steps. The checklist provided is based upon lessons learned and best practices, but it should be customized for your facility, based upon your new plan.

Review Plans to Determine Gaps and Areas for Improvement

Review the progress you have made. Use the Facility Assessment Checklist, included at the end of this step, to review your plans and consider the following for each step.

Step 1: Partnerships

- Have you included all the necessary partners in the planning process?
- Is all contact information for partners up to date? Are contact lists readily available?
- Does someone from the facility monitor State Animal Health Official and USDA websites for disease information?
- Have you received a Premises ID from your SAHO and been added to the response database?

Step 2: Business Model

- Have you thoughtfully identified the key components of your business model?
- Has your planning accounted for any concerns unique to your business model? Are these concerns articulated in your plan document?
- Does your SAHO recognize the key components of your business model? (Preservation, Conservation, Animal Movement, Visitation, Assisted Reproductive Technology?)

Step 3: Risk Assessment

- Have you performed a facility risk assessment?
    - The risk assessment helps you identify routes of possible entry for disease agents. Use the Disease Risk worksheet, and update it for your specific needs using your planning partners and the reference materials.
- Have you identified risks outside your facility and discussed their impact with your SAHO?
    - These include other susceptible animal populations, such as wildlife.

Step 4: Roles for Personnel

- Have you discussed with your SAHO the possible roles that your staff may fill during a disease response?
    - Remember, you are the subject matter experts for handling your animals. Understand your potential roles in disease response.
- Have you considered basic ICS training for key staff?

- State and Federal responders will use the Incident Command System to organize a response to disease events.

Step 5: Biosecurity

- Have you used your risk assessment to understand the possible entry points for given diseases?
- Have you selected your Biosecurity Manager?
- Did you construct your Facility map?
- Have you considered your Lines of Separations (LOS) and designated important areas such as your isolation area for susceptible animals? Your Controlled Access Points (CAPs) and nd the biosecurity protocols you will implement at those CAPs, depending on levels of disease risk?
- Have you shared your biosecurity plan with SAHOs for their input?

Step 6: Surveillance

- Have you discussed surveillance challenges with your SAHO?
    - Remember that actual surveillance tactics will be determined by SAHOs and USDA, and they will change based upon zone and premises designations. You should discuss challenges with your SAHO, including the types and methods of surveillance that will allow your facility to achieve the monitored premises designation if your business model includes animal movements and or visitation.
- Has your facility proposed methods for Active Observational Surveillance (AOS) for your animals? Has your facility received feedback on this from your SAHO? Have you proposed an AOS form to your SAHO for possible use?
- Have you discussed the possible use of sentinel animal species during disease outbreaks?

Step 7: Operations

- Have you discussed operations activities options and challenges with your SAHO?
    - Actual tactics required during an outbreak will be identified by your SAHO and USDA.
- Have you discussed managed euthanasia with your SAHO?
- Have you identified if it is possible to compost infectious material on facility property? Would burial of material be possible? Are there other disposal options that would work for the expected mortality at your facility?
- What organizations would the SAHO and the facility need to have at the table to discuss possible disposal methods (e.g., Environmental Protection Agency (EPA), local municipality)?

Step 8: Media and Communications

- Have you considered how media will react to a disease event that could involve your facility?
- Have you designated a spokesperson who will speak to the media on your behalf?
- Have you arranged a meet and greet between the facility spokesperson and the SAHO PIO to discuss media and messaging strategies and resources?

- Have you determined all the potential stakeholder groups with whom you will need to communicate with during a disease event and the best methods to communicate?

Step 9: Recovery

- Has your planning identified the financial resources available to help you recover?
- Does the facility have a good understanding of insurance coverage that may assist in recovery efforts?

Train Employees to the Plan

For any plan to succeed, the people expected to implement the plan must be trained how to execute the plan.

Because your plan will be specific to your facility, a training program must be tailored to your unique plan. In addition to training staff to your facility plan, there are additional general training courses and topics that may be appropriate for staff, based upon what they are expected to perform. These may include:

- Media training
- Personal Protective Equipment (PPE) use
- Disinfection techniques
- Set-up of and monitoring of the cleanliness of footbaths or other biosecurity measures outside the scope of normal routines

Owners and operators may want to consider the following courses to understand how a disease response is organized. State and federal response agencies rely on the National Incident Management System and the Incident Command system to organize disease response. These are on-line courses through the Federal Emergency Management Agency's training portal[41], including the following free trainings:

- ICS 100 & 200
- NIMS 700 & 800

Remember, not everyone needs all types of training.

Demonstrate your Ability to Implement your Plan

[41] See the Emergency Management Institute's website at https://training.fema.gov/is/crslist.aspx for additional details on available training.

A plan on paper is great, but can you implement it? Step 10 is an ideal time to invite your SAHO to your facility, and walk them through your preparedness plans. Ideally, this walk through will validate your plan, and it may result in your SAHO making some suggestions for improving your plans that have not yet been considered. It is important to request a walk-through before you have a disease incident, as officials will be extremely busy during an outbreak.

As your staff becomes more proficient in their ability to execute your plan, discuss with your SAHO how your facility might become involved with a state-level exercise; FMD exercises are often conducted in the agricultural industry. The ability to observe and participate in these exercises can give you a sense of the complexity of response issues and may give you additional ideas to improve your plans.

Determine timetables for plan review

All plans are living documents. They should be reviewed and improved at least annually. Consider reviewing and updating your plans:

- If there is a change in species that you manage (not all species are susceptible to all diseases).
- After key staff positions change, or when a new veterinarian is hired or contracted.
- If there is a change in workflow, paths, or exhibits in your facility. This may require revisiting your map to identify new Lines of Separation (LOS) and Controlled Access Points (CAPs)
- After a Foreign Animal Disease outbreak
    - After the avian influenza outbreaks of 2014-2016, USDA and states conducted After Action Reports (AARs) on lessons learned from the outbreaks. While diseases differ, there are often lessons learned that can help in any disease outbreak.
- After the facility participates in any training or exercise that highlights gaps in their plans.

SZS Final Facility Assessment Checklist

You did it! **The following assessment checklist includes all of the tasks that you have already begun or completed in your planning process.** Use this assessment to track your overall progress, and remember to go back and record any additional actions that your team is planning to take in each of the various steps. A final Assessment Checklist will be included in Step 10.

Step 1

- ☐ Ensure that contact Lists for all employees, volunteers, etc. are current and review schedule is determined to keep updated.
- ☐ Determine which staff members should contribute to plan development.
- ☐ Review current capabilities of facility staff and describe any Facility Response Team that may have been designated or trained (there will be more on this in Step 4).
- ☐ Provide SAHO the names, phone numbers, and email addresses for designated contacts at the facility to convey information/answer questions, etc. At a minimum, this should include owner/operator and the facility's veterinarian. Preferably, it will include at least three individuals listed in order of authority to make decisions for the facility.

  See the "Facility Information worksheet" included at the end of this step.
- ☐ Maintain current notification list for vendors for communication and trace back.
- ☐ Discuss roles and responsibilities of other jurisdictions (agencies) in the event of a FAD. (This will vary tremendously from state-to-state, and incident-to-incident. However, explore perceived roles and responsibilities of other partners such as Emergency Management, appropriate Law Enforcement, etc.)
- ☐ Determine if exotic animal industry has been considered in State disease planning. Discuss the possibility of including an exotic animal industry response addendum to State FAD Response plans with your SAHO if not already considered
- ☐ Review the SAHO's triggers for FAD preparedness and response and develop facility-appropriate capabilities to meet preparedness levels.
- ☐ Devise and agree upon response objectives for FADs with SAHOs, both for if your facility is negative and in a Control Area, as well if the facility becomes infected.
- ☐ Begin sharing animal valuation (or any supporting documentation) with SAHOs to assist with planning and response. See Step 2 more information on valuation.
- ☐ Obtain a Premises ID number by contacting your SAHO (this may not be available in all states).
- ☐ _____
- ☐ _____

Step 2

Preplanning for Preservation

- [ ] Use the worksheet below to determine goals and objectives for preserving your collection during disease events, if applicable.
- [ ] Determine the value of your collection. This could be monetary value, conservation value, or any way the facility chooses to assign value (such as value to the community if an animal is iconic). Determine a hierarchy of animals or species that may be your highest priority for preservation.
- [ ] Use prioritization and valuation of animals/species to guide response tactics, such as movement, preservation activities (vaccination), or euthanasia.
- [ ] Assemble pertinent valuation information to share with your SAHO. Discuss how best to preserve your collection; this discussion will help determine biosecurity strategies and tactics. If possible, prioritize response (e.g., isolation, euthanasia, isolation) by species and biosecurity level.
- [ ] _____
- [ ] _____

Preplanning for Animal Movements

- [ ] Use the worksheet below to help you determine goals and objectives for movement of animals during disease events, if applicable.
- [ ] Ensure that your SAHO understands the importance of animal movements to your business model.
- [ ] Discuss movement protocols to implement when moving any animal **into or out of** the collection to minimize disease risk, recognizing appropriate permits (e.g., Certificates of Veterinary inspection), and establishing isolation of new incoming animals as appropriate and required.
- [ ] If your facility is engaged in rehabilitation of wildlife, create intake protocols that protect "permanent" animal populations by setting up intake, holding, and permanent animal housing areas as well as an isolation area. Discuss conditions that would halt rehab animal intake.
- [ ] Discuss the permitting process that will likely be required for Control Areas to ensure you understand what might be required to allow movements (documentation/premises ID numbers and then surveillance and biosecurity measures, which will be discussed in later steps).
- [ ] Use the worksheet below to help you determine goals and objectives for movement of animals during disease events, if applicable.
- [ ] _____

- [ ] _____

Preplanning for Visitation

- [ ] Use the worksheet below to help you determine goals and objectives for visitation during disease events, if applicable.
- [ ] Ensure that your SAHO understands that visitation is a critical part of your business model, if applicable.
- [ ] Calculate how long your facility can remain solvent while closed due to disease. Share this information with your SAHO.
- [ ] Discuss whether your SAHO will want to require a permit for visitation for the facility if it is located in a Control Area. SAHOs would likely require specified surveillance and biosecurity measures to grant a permit.
- [ ] Develop contingency plans for a visitation model (e.g., transitioning from self-guided contact tours to supervised non-contact tours) for those facilities that allow interaction with animals.
- [ ] _____
- [ ] _____

Preplanning for Assisted Reproductive Technology

- [ ] Use the worksheet below to help you determine goals and objectives for assisted reproductive technologies during disease events, if applicable
- [ ] Ensure that your SAHO is aware that gametes, embryos, or other reproductive materials are stored on site.
- [ ] Establish sound standard operating procedures for preservation of genetic material that minimizes disease risk.
- [ ] Develop recordkeeping practices for gamete storage tanks (this will be important in disease tracing activities).
- [ ] _____
- [ ] _____

Step 3

- [ ] Review the Disease Risk Worksheet and the Wildlife Site Assessment Zoo Questionnaire (found in the Resources section of Step 3) with your attending veterinarian. Use these documents and other noted references to conduct a risk assessment of your facility. Determine if additional protective measures can be taken to reduce risk of disease.
- [ ] Discuss risk from and to neighbors that have susceptible species for diseases with cross-contamination concerns (e.g., facility to agriculture/agriculture to facility)
- [ ] Share the results of your self-assessment with your SAHO. Discuss any additional actions that can reasonably be taken to reduce the risk of disease.
    - Explore identified threats with your SAHO, including those without obvious mitigation/prevention strategies. In some cases, there may be resources available to reduce risk that are known to your SAHO, but might not be known to you. An example might be decontamination agents or equipment that could be mobilized for mitigation assistance.
- [ ] _____
- [ ] _____

Step 4

- [ ] Identify what roles staff would play in a response, and identify those individuals that best fit those roles. (Under the direction of the SAHO, the facility must be prepared to assist in response.)
- [ ] Identify which staff members are the most critical to respond on your behalf during a disease event. These individuals must be capable of following biosecurity protocols, must be proficient at following directions, and must be keen at observing animals and reporting signs of illness.
- [ ] Identify staff that are trained in public affairs and social media matters or identify other resources available to manage the influx of calls, stories, and communications associated with an outbreak.
- [ ] Identify any additional training that staff requires to assist in a Foreign Animal Disease (FAD) event. This may include additional training on the Incident Command System, the use of Personal Protective Equipment (PPE) (essential in zoonotic diseases), and cleaning and disinfection protocols (see Step 5). Review your list of training with your SAHO.
- [ ] Identify the trained individuals who would represent the facility in support of the SAHO Incident Management Team (IMT). These individuals should have the authority to make critical decisions for the facility. (Minimum recommended training for any facility representative would be ICS 100, 200, and 700.)
- [ ] Incorporate any new training into your facility training program. Suggest a “date by” which any new training should be completed, and record completion of any new training requirements.

- [ ] Conduct an “in-house” exercise where your staff can work through a scenario that would help them practice their roles. Your SAHO can assist you in crafting a scenario that would be interesting and informative to staff.
- [ ] _____
- [ ] _____

Step 5

Preplanning

- [ ] Identify and designate a Facility Biosecurity Manager to oversee biosecurity planning and response.
- [ ] Use the “Biosecurity Measures Picklist” worksheet found at the end of this step to select appropriate biosecurity measures to incorporate into your facility plan.
- [ ] Develop a map of your facility using the mapping tool.
- [ ] Discuss and identify characteristics of isolation area(s), if feasible.
- [ ] Discuss and develop Controlled Access Points (CAPs) procedures at different Levels. If you are using the mapping provided with Secure Zoo, you can add these procedures to your map.
- [ ] Identify Lines of Separation (LOS) that can be established and describe how they would be used at different Levels of disease risk. These can be drawn on the map.
- [ ] Discuss and develop vendor biosecurity protocols. Use the Biosecurity Measures picklist as a guide.
- [ ] Discuss and identify appropriate cleaning and disinfection protocols for appropriate disease agents recognized in risk assessment. More on cleaning and disinfection will be discussed in Step 7.
- [ ] Develop standard operating procedures (SOPs) for staff who work with and/or own animals outside of normal business hours (e.g., during HPAI outbreaks, staff may not be allowed to work with poultry or visit areas where they may come into contact with poultry).
- [ ] Work with your SAHO for assistance with identifying appropriate protective measures at all levels, from daily operations to heightened disease risk, with particular emphasis on defining triggers that indicate when stricter biosecurity is needed (see Step 1). Some of this information may already be available in your state's foreign animal disease plans. Review those if they are available.
- [ ] Develop standard operating procedures (SOPs) for staff who work with and/or own animals outside of normal business hours (e.g., during HPAI outbreaks, staff may not be allowed to work with poultry or visit areas where they may come into contact with poultry).

☐ _____

☐ _____

Level 1

These are day-to-day operational considerations that will include increased biosecurity and surveillance measures when an outbreak threatens, but may not be imminent (e.g., an outbreak in a neighboring state or county). This level would include premises in Disease Free Areas.

☐ Attend SAHO and industry conference calls as available and consult your SAHO's website frequently during an outbreak in order to keep up to date on available guidance and epidemiology associated with the disease agent,

☐ Review pre-identified roles and disease-specific responsibilities of your Facility Response Team that you identified in Step 4.

☐ Inventory and test protective and response equipment to determine if additional equipment and supplies are needed during heightened risk levels.

☐ Implement your Level 1 plans and prepare to operate as an At-Risk/Monitored Premises (Level 2) when designated as such by state officials (i.e. in a zone near an outbreak). This should include:

- Implement Lines of Separation. See Secure Zoo Lines of Separation Guidelines and mapping tools in Step 5 for more information.
- Implement Level 1 Controlled Access Points for the access of personnel, vendors, materials, equipment, feed, and other supplies.
- Implement cleaning and disinfection procedures appropriate to facility and level of risk.
- Demonstrate that staff and/or visitors are capable of implementing and adhering to appropriate biosecurity measures for Level 1.

☐ Re-examine risk to the facility and species housed, based on the specific disease agent and its related considerations:

- Reevaluate unintentional human vectors (e.g., staff, visitors, volunteers, vendors) as cross-contamination into the facility from pets, other animals at home, wildlife, or cross-visitation with other facilities.
- Discuss discontinuation of human-to-animal contact (e.g., discontinue petting zoo operations if present) as well as visitor feeding of susceptible collection animals.
- Consider movement of collection animals to more biosecure locations if specified in plan (movement of animals, even within the facility at Level 2 and Level 3 will require approval by SAHO). Assess the need for all animal movements (imports) into the facility. (At Level 3, the facility will be under quarantine, and movement of live animals into the facility will not be applicable.)

☐ Review plans for operating under Suspect or Contact Premises (Level 3) designations. Be prepared in case disease risk increases.

☐ _____

☐ _____

Level 2

These are enhanced measures for uninfected facilities located within a designated Control Area adjacent to an infected premise (i.e., At-Risk and Monitored Premises). ***These are in addition to Level 1 considerations.*** *The SAHO must pre-approve and ensure response plan meets overall response objectives.*

☐ Determine the current objectives of the state and USDA management plans and determine how this affects your Level 2 plans (e.g., early in an outbreak period, response objectives may be to stamp out the disease. If an outbreak is widespread, and past the ability to stamp out, a more managed approach will be taken).

☐ Determine if an Incident Management Team Policy Group has been formed to work through issues that a facility would face if they move from a Free Area to Control Area. Currently, there is a Zoo Unit comprised of USDA and subject matter experts in the zoological field to assist the National Incident Management Team should a zoological facility become involved in a disease response. You can review the Zoo ConOps guide in Step 4 for more information.

☐ If your facility is in a Control Area, ensure that you communicate with your SAHO on any additions or changes regarding acceptable methods and protocols for biosecurity/surveillance not previously outlined in facility planning.

☐ If your facility is in a Control Area, be prepared to provide all of your protective and response equipment **while your premises is negative.**

- *Note: USDA covers the cost of surveillance/sampling diagnostics when a facility is in the Control Area, with or without cost sharing from the state.*

☐ Identify the trained individuals who would serve in support of the SAHO's Incident Management Team (IMT). These individuals would be in a response capacity at your facility and should have completed the minimum training recommended in Step 4 (ICS 100, 200, 700). Your SAHO may require additional training depending on the disease agent (zoonotic disease, such as HPAI, will require staff to have Personal Protective Equipment training).

☐ If requested, the facility should provide a Liaison to the SAHO IMT, as directed by your SAHO/State Response Plan.

☐ Determine if isolation of susceptible species is possible and/or practical. Determine time frames needed for isolation based on incubation periods; recommendations may include doubling the incubation period (e.g., 2 periods of 14 days = 28 days for many viruses).

☐ Review Lines of Separation (LOS) and Controlled Access Points (CAPs). Determine if changes need to be made to increase biosecurity based on heightened disease risk at this Level. Implement your plans that meet with approval of the SAHO for Level 2.

- [ ] Demonstrate that staff and/or visitors are capable of implementing appropriate biosecurity measures for Level 2.
- [ ] Implement additional Level 2 cleaning and disinfection procedures.
- [ ] Implement Vendor biosecurity protocols
- [ ] Recognize that surveillance will take place once you are in a Control Area (more on surveillance is provided in Step 6).
- [ ] Fully understand the permitting process for the movement of animals into or out of Control Areas and Infected Zones. Obtain necessary permits to minimize risk associated with animal movement.
- [ ] _____
- [ ] _____

Level 3

This level indicates the highest level of biosecurity. This is to prevent further disease spread in the collection, or outward from an Infected Premises. ***These are in addition to Level 1 and 2 considerations.*** *These same measures may be applicable for Contact or Suspect Premises until final determination of infection is made.*

- [ ] If your facility is an Infected Premises, ensure that you communicate with your SAHO on any additions or changes regarding acceptable methods and protocols for biosecurity/surveillance not previously outlined in facility planning.
- [ ] Determine the current objectives of the state and USDA management plans, and how this affects your Level 3 plans. (For example, at the beginning of an outbreak, in a small geographic area, stamping out of the disease may be the tactic of choice. However, if outbreaks are prolonged, allowing for recovery following infection, or a vaccination strategy may be employed.)
- [ ] Review Lines of Separation and Controlled Access Points (CAPs). Determine if changes need to be made to increase biosecurity based on heightened disease risk at this Level. Implement your plans that are approved by your SAHO for (LOS) Level 3.
- [ ] Determine the need for additional structural protection (e.g., fences, walls, barriers, distance).
- [ ] Operate under quarantine restrictions (no animal movement) and approved biosecure *human* movements. Business will likely be operated without visitor revenue for the time frame needed to resolve infected status and ensure no further spread through the facility.
- [ ] _____

☐ _____

Step 6

Preplanning

☐ Review disease susceptibility of species in your collection for Foreign Animal Diseases or other high consequence diseases to understand surveillance needs.

☐ Review the surveillance resources in this step as part of your planning process. These are the "playbooks" used by SAHO Incident Management Teams (IMTs), and reviewing them will be valuable prior to discussing possible disease surveillance strategies for your animals.

☐ Determine the challenges your facility may have with traditional, hands-on sampling strategies and prepare to discuss with your SAHO.

- Propose potential strategies to address these challenges.
- Discuss what resources that might be needed to conduct surveillance. Understand what materials are provided by the Incident Management Teams, and what resources may have to be sourced (capture pens, dart equipment, etc.).

☐ Understand the surveillance testing that is performed on domestic species.

- Though these diagnostic tests are not validated for the use in exotic species, it is recognized that they will still be used. More information on decision-making for the types of tests used for FMD can be found in the NAHEMS FMD Standard Operating Procedures: Surveillance document, page 11.

☐ Determine if there are susceptible domestic species adjacent to your facility using the map you created in Step 5. Be prepared to discuss with your SAHO how this information may be used to convey disease status at various Premises designations.

☐ Discuss the possibility of using Active Observational Surveillance (AOS) for your facility. Review the module in the resources section and customize the AOS form as needed.

☐ Propose a discussion with your SAHO once you have learned more about domestic animal surveillance and discussed surveillance challenges with your team. This should include:

- Review of your Biosecurity protocols, using your map and Step 5 plan.
- Discussion of your facility's surveillance challenges based on susceptible animals in the collection and how they are housed.
- Presentation of your facility's approaches for surveillance. These approaches may include novel Active Observational Surveillance techniques or the use of domestic sentinel animals within the facility.
- A discussion of surrounding animal species that may be used as sentinel animals to confer disease status to your facility.

☐ _____

☐ _____

Level 1

Take these steps if your facility finds itself at Level 1 (disease nearby, but you are currently in a Free Area)

☐ Participate in any industry or SAHO calls to determine any surveillance strategies necessary at this risk level.

☐ _____

☐ _____

Level 2

Take these steps if you are an Uninfected, At-Risk, or Monitored Premises in a Control Area

☐ Work with SAHO to meet surveillance parameters, as determined by SAHO and Premises Designation.

☐ Determine how frequently samples would need to be submitted to permit business continuity goals.

☐ _____

☐ _____

Level 3

Take these steps if you are an Infected, Contact, or Suspect Premises

☐ Provide surveillance samples according to SAHO protocols.

- Your facility will likely be closed to visitation (at least for a period of time) with this designation. Surveillance strategies will be determined by disease agent, biosecurity protocol implementation, and other risk factors.

☐ _____

- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____

Step 7

Preplanning for Facility Managed Euthanasia Guide

- [ ] Document which species you manage that should be spared if at all possible (Step 2, Understanding Your Facility's Business Model).
- [ ] Document which species are of low conservation or monetary value (Step 2, Understanding Your Facility's Business Model). The ability to return to normal business more quickly may make euthanasia of these animals a practical consideration.
- [ ] Discuss potential legal implications with managed euthanasia of species. Understand what regulatory agencies may need to be involved in the decision-making process based on species.
- [ ] Review the NAHEMS: Mass Depopulation and Euthanasia guide in the Resources section of Step 7.
- [ ] Discuss and document challenges associated with finding all animals in large enclosures (e.g., drive through safari parks, conservation centers).
- [ ] Discuss/determine what euthanasia supplies are kept on hand. Discuss availability of euthanasia solution, appropriate ammunition, and/or materials that have limited access or that have special requirements to obtain.
- [ ] Determine any additional special handling equipment that may be necessary for managed euthanasia.
- [ ] Discuss and document the training that your staff has completed/needs to carry out for various euthanasia procedures (e.g., the facility has veterinary support and expertise with the affected species to administer euthanasia solution, or, the game ranch has access to sharp shooters for expansive areas).
- [ ] Facility will discuss strategies for disposition of infected/exposed animals with the SAHO.
- [ ] The approved plan will be implemented for animals that require euthanasia due to animal welfare, to halt disease spread, and for those that pose a critical risk to collection
- [ ] _____
- [ ] _____

Preplanning for Facility Disposal Guide

- ☐ Review the National Animal Health Emergency Management System (NAHEMS): Disposal Guide in the Resources section of Step 7.
- ☐ Discuss and document what types of material may become contaminated by diseased animals. This would include bedding, manure, unused feed, contaminated water, etc.
- ☐ Consider disposal of contaminated materials and carcasses:
  - Discuss and document current disposal methods. Recognize the biosecurity risks current disposal methods may pose.
  - Determine if there are any appropriate areas on grounds for composting. This option is more appropriate for rural or expansive areas.
- ☐ Determine any appropriate areas on grounds where contaminated materials or carcasses may be *stored* temporarily until IMT determines the most appropriate disposal methods.
- ☐ Determine water run-off patterns that may affect disposal options. Consider discovering the location of water table depth, which may automatically rule out disposal options, such as burial on grounds.
- ☐ Implement the disposal plan as approved by the IMT.
- ☐ Discuss with SAHO the draining of ponds to discourage wildlife for diseases where wild birds act as reservoirs. (The value of draining the ponds and the ability to actually do so should be part of this discussion. Environmental impact from pond drainage/disposal of sediment and risk of spreading disease are some of the considerations.)
- ☐ Consider and discuss appropriate wild animal and scavenger protocols, as well as necessary rodent and insect control programs. Any disposal areas, temporary or permanent, will require strict vermin control programs.
- ☐ _____
- ☐ _____

Preplanning for Facility Decontamination Plan

- ☐ Review the National Animal Health Emergency Management System (NAHEMS): Cleaning and Disinfection Guide in the Resources section of Step 7.
- ☐ Review your standard operating procedures and biosecurity plans to determine how effective they would be should the facility become infected.
- ☐ Review Controlled Access Point (CAP) procedures (Step 5, Biosecurity Program and Map) to determine if they are adequate to operate as an infected facility.

- [ ] Discuss Personal Protective Equipment (PPE) needs for personnel during cleaning and disinfection activities during an outbreak.
- [ ] Discuss personal hygiene actions that may need to be altered (e.g., increased handwashing).
- [ ] Develop a cleaning and disinfection equipment inventory (e.g., hand sprayers, decon agents, foot baths, power washers and other equipment). Establish scheduled equipment checks to ensure they are in good working order.
- [ ] Discuss the challenges of decontamination of objects that cannot be thoroughly cleaned prior to disinfection. Dry lots, grassy exhibit areas, wood, etc. are difficult to clean thoroughly prior to disinfection. Be prepared to discuss these concerns with your SAHO and the IMT.
- [ ] Identify where it may be possible to disinfect vehicles prior to them entering the facility. The final location of these wash areas will be determined by the IMT's final plan, but considering acceptable sites as part of the planning process may speed up response time.
- [ ] Implement the Decontamination plan approved by the IMT
- [ ] _____
- [ ] _____

Step 8

Preplanning

- [ ] Read through the FMD Ready Reference Guide in the Resources section. This is an excellent reference to learn more about the "process" that should be considered when communicating about a foreign animal disease (FAD). For more detail, review the Highly Pathogenic Avian Influenza Standard Operating Procedures: Communications. This communications plan was recently "tested" during the avian influenza outbreaks of 2014-2016. Think about similarities or differences in the plan for a FMD or other FAD event.
- [ ] Review the Media and Communications Quick List for tips on media and communication with insights into the various audiences you may need to reach in a disease event.
- [ ] Understand how to find information about disease outbreaks in your state by locating and periodically reviewing disease information on your State Veterinarian's webpage.
- [ ] Request participation on any list servs, conference calls, or other industry information on disease issues hosted by your SAHO
- [ ] _____
- [ ] _____

Media Preplanning

- [ ] Determine who will serve as the PIO for your facility.
- [ ] Set policy for who is able to speak with the media. Consider role playing with staff, including scenarios that feature intense lines of questioning.
- [ ] Develop messaging templates that can be modified by disease and consider how they can be tailored to each stakeholder group.
- [ ] Develop a social media policy for staff. Determine basics of what should and should not be shared unless it is an official posting from authorized personnel.
- [ ] Designate someone to monitor and/or proactively communicate via social media. This can help inform the public, dispel rumors, and notify changes that may affect visitation at various premise designations.
- [ ] _____
- [ ] _____

Communication Preplanning

- [ ] Develop Contact lists for communications. Designate someone at your facility to keep these updated.
- [ ] Identify the internal stakeholder groups at your facility. The larger the facility, the more groups you will likely have. This may include staff, volunteers, interns, docents, and donors.
- [ ] Develop a facility (in-house) notification plan for time sensitive messages for employees and vendors.
- [ ] Determine what methods you will use to communicate with each stakeholder group. Options include meetings, texting, emails, conference calls, letters, and social media platforms.
- [ ] Determine who has responsibility to reach out to vendors at heightened risk of disease. Formulate a list of questions that could be asked to help assess the risk of possible infection transmission (See Step 3, Risk Assessment)
- [ ] Determine who has the responsibility to reach out to external stakeholders such as county extension, county (or local) emergency management, neighbors, and other businesses.
- [ ] _____
- [ ] _____

Level 1, 2, or 3 of heightened disease risk or infection

- [ ] Review any contact lists that were developed in the planning process; update as needed.
- [ ] Ensure that the SAHO has entered any pertinent information about your facility into databases or communications chains in disease events.
- [ ] Provide a facility Public Information Officer (PIO) to the JIC as requested.
- [ ] Ensure that there is connection to the Joint Information Center (JIC) for development of appropriate messaging.
- [ ] Discuss how employees will use the facility's website, social media, and other communications channels to educate public/visitors on any changes to visitation policies or to provide other informational updates.
- [ ] Create content that is consistent with the facts being shared by SAHOs and the JIC for the facility's website, social media and other communications channels.
- [ ] _____
- [ ] _____

Step 9

- [ ] Consider what the facility's goals may be in recovering from a catastrophic event due to disease or disaster.
  - For example, if a collection is highly susceptible to catastrophic diseases such as FMD, would the facility consider changing its collection plan to species not susceptible to catastrophic disease?
- [ ] Determine how much money is in reserve to operate the facility while it remains closed to visitation. Share during earlier stages of planning with regulatory partners.
- [ ] Make sure management can provide accurate information about potential financial borrowing capabilities.
- [ ] Understand facility insurance coverage. Include the following
  - Loss of animals due to disease
  - Loss of revenue (business continuity insurance)
  - Unemployment compensation (understand coverage if staff has to be temporarily laid off of released)
- [ ] Recognize the facility's eligibility for FEMA support for disease or disasters. Currently, FEMA has not provided reimbursement for disease events. However, for natural disasters, depending on your business model, you may be eligible for FEMA programs.

- [ ] Determine who at the facility might be responsible for donor outreach and fundraising during financial hardship.
- [ ] Identify colleagues in the industry who have been through a recovery process. Document the lessons learned that could make your recovery more successful.
- [ ] Consider participating in state-level disease response and recovery exercises to test your plan, determine gaps, and learn from agricultural partners about recovery issues.
- [ ] Review the goals and objectives of recovery. Are they still consistent and achievable?
- [ ] _____
- [ ] _____
- [ ] _____
- [ ] _____

Glossary

- **Assisted Reproductive Technologies (ART) -** Procedures that are employed by some facilities that include gamete collection and storage, or artificial insemination. In the context of Secure Zoo, facilities that are engaged in ART should not forget biosecurity protocols to ensure that these products remain disease free.
- **Biocontainment -** Measures taken to prevent the spread of disease agents from infected animals to uninfected animals.
    - For more information see the NAHEMS Guidelines: Biosecurity document
- **Bioexclusion -** Measures taken to prevent the introduction of disease agents into a naïve (susceptible) population.
- **Biosecurity -** A series of management practices designed to prevent the introduction of disease agents onto or prevents the spread from an animal facility.
    - **Conceptual Biosecurity -** This refers to where a facility is located with regard to other premises that hold susceptible animals, and the scope and size of nearby operations.
    - **Operational Biosecurity -** How a facility is managed to prevent introduction of pathogens. This includes personnel protocols and how equipment and materials are moved through the facility.
    - **Structural Biosecurity -** Refers to walls, fences, buildings which are physical barriers to prevent movement of animals or people into different areas. They vary in their ability to prevent wildlife from moving area to area.
    - For more information see the NAHEMS Guidelines: Biosecurity document
- **Biosecurity Levels -** Procedures identified to **bioexclude** or biocontain a disease agent. 'Levels' refers to increasing (or decreasing) tasks to be done, based on disease risk. Ideally, the concept of 'levels' may decrease the likelihood of biosecurity fatigue. If disease risk is determined to be low, less stringent biosecurity protocols may be appropriate.
    - **Level 1: Preventive Biosecurity -** These protocols are designed to prevent introduction of a disease at facilities outside of the Control Area during the threat or occurrence of an outbreak. (The Control Area is a designated geographical area, determined by regulatory officials)
    - **Level 2: Control Area Biosecurity** - These enhanced biosecurity protocols are used at uninfected facilities located in the Control Area (At Risk and Monitored Premises),and would vary for each disease outbreak (but could be extended months to years of an outbreak).
    - **Level 3: Quarantined/Infected Premises Biosecurity -** This is the strictest level of biosecurity and is intended to contain an outbreak or potential outbreak in Infected, Contact, or Suspect Premises within the Control Area.

    - For more information see Step 5.
- **Biosecurity Manager -** The role of a Biosecurity Manager is to work through the biosecurity guidance found in Secure Zoo Strategy and other FAD documents, with the goal of building a biosecurity program for their facility.
    - For more information see Step 5.
- **Controlled Access Point (CAP)** - These are the entrances and exits where biosecurity programs including Personal Protective Equipment (PPE), Cleaning and Disinfection (C/D), and other protocols to ensure that disease agents are not moved into or out of adjacent areas.
    - For more information see Step 5.
- **Depopulation -** A tactic employed frequently in food production species to rapidly decrease the population of animals, with the goal of minimizing the spread of disease, and returning the facility to production of disease free animals as soon as possible. Ideally, depopulation should be done as quickly and humanely as possible.
- **Emergency Operations Center (EOC) -** A physical location where various agencies involved in disease response collaborate and plan for the management of the outbreak.
- **Exotic Animal Industry (EAI) -** This term is meant to describe the various business models that exhibit, breed, or own exotic species OR captive native wildlife of high conservation value (E.g. native Sonoran pronghorn antelope or Florida Key Deer).
- **Fomite -** objects or materials which are likely to carry infectious materials, such as clothes, utensils, and tools.
- **Foot-and-Mouth Disease (FMD) -** a viral disease which affects (primarily) cloven hooved species. The disease can cause high rates of infection, with variable rates of mortality. The concern with FMD is the detection of the disease in the United States will result in a very expensive response strategy to return the Nation to 'disease-free' status. This disease free status is highly desirable for the trade of agricultural products around the world.
- **Federal Animal Health Official (FAHO) -** A Federal employee, usually employed by the United States Department of Agriculture that assists with disease response.
- **Foreign Animal Disease (FAD) -** A special classification of infectious diseases or pests not normally found in the United States, though they may be found with some frequency in other parts of the world.
- **FAD Response Plan -** Plans that are developed on the National, State and Facility level which includes procedures for response to and control of Foreign Animal diseases.
- **Foreign Animal Disease Diagnostician (FADD) –** A specially trained veterinarian who begins the initial disease investigation process, which includes taking biological samples to determine presence of FAD pathogens.
- **Highly Pathogenic Avian Influenza (HPAI) -** A group of Influenza A viruses that cause severe disease in poultry. The recent management of HPAI outbreaks in the US have cost billions to control.
- **Incident Command System (ICS) -** The Incident Command System (ICS) is a management system designed to enable effective and efficient domestic incident management by integrating a

combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure.
    - For more information see the FEMA ICS Resources.
- **Incident Commander (IC) -** The individual who is responsible at the highest level for the management of the incident.
- **Incident Management Team (IMT) -** a group that has the expertise and authority to respond to an emergency. In this context, these individuals have the skills needed to respond to animal disease events.
- **Isolation (area) -** As used in Secure Zoo, isolation has 2 possible meanings. It may refer to a highly biosecure area where valuable susceptible animals can be housed to prevent disease exposure. Isolation may also be a highly biosecure area where valuable, infected animals may be allowed to recover from disease.
- **Lines of Separation (LOS) -** An established boundry (either physical, or by policy) that cannot be 'crossed' without undergoing biosecurity protocols to prevent possible transfer of disease agents from one area to another.
- **Managed Euthanasia** - A tactic that may be considered with exotic species in response to an FAD outbreak. The recognized methods of euthanasia would still be considered, as opposed to depopulation methods that are often employed in production agriculture.
- **National Animal Health Emergency Management System (NAHEMS)** - The National Animal Health Emergency Management System (NAHEMS) is an integrated system for dealing with animal health incidents in the United States, such as the incursion of a foreign animal disease or a natural disaster.
    - For more information visit the USDA website or view guidelines here.
- **Premises Designations** - A term assigned to a premise based upon disease detection, or risk of disease detection. The assignment of a premise designation determines activities that will occur to manage a disease, or allow business to continue as usual.
    - **At-Risk -** Premises that have susceptible animals, but none of those susceptible animals have clinical signs compatible with disease. Premises objectively demonstrates that it is not an Infected Premises, Contact Premises, or Suspect Premises. At-Risk Premises seek to move susceptible animals or products within the Control Area by permit. Only At-Risk Premises are eligible to become Monitored Premises.
    - **Contact -** Premises with susceptible animals that may have been exposed to disease, either directly or indirectly, including but not limited to exposure to animals, animal products, fomites, or people from Infected Premises.
    - **Free -** Premises outside of a Control Area and not a Contact or Suspect Premises.
    - **Infected -** Premises where a presumptive positive case or confirmed positive case exists based on laboratory results, compatible clinical signs, case definition, and international standards.
    - **Monitored -** 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 of of the Control Area by permit.
    - **Suspect** - Premises under investigation due to the presence of susceptible animals reported to have clinical signs compatible with disease. This is intended to be a short-term premises designation.
    - For more information see the USDA HPAI Ready Reference Guide – Overview of Zones.
- **Premises ID -** A unique letter/number system that may be assigned to a facility that houses exotic animals. These IDs are extremely helpful in the traceability of animals and products in disease events. A State Animal Health Official will know if your facility is eligible for a Premises ID number.
    - For more information visit the USDA website.
- **Public Information Officer (PIO) -** An officer in the Incident Command system that are the communications coordinators or spokespersons during the disease event.
- **Quarantine -** "quarantine" refers to imposing stringent restrictions on entering or leaving a premises, area, or region where disease is known to exist or is suspected. During an FAD outbreak, a quarantine broadly prohibits the movement of animals, animal products, and fomites (e.g., equipment, vehicles, clothing, footwear) from a specified premises, area, or region.
    - For more information see the NAHEMS Guidelines: Quarantine and Movement Control.
- **Secure Food Supply Plans -** The Secure Food Supply Plans for poultry, milk, pork and beef were developed to aid producers, transporters and food processors in the event of a foreign animal disease outbreak. These response plans are designed to avoid interruptions in animal/animal product movement from operations with no evidence of infection and maintain business continuity.
    - For more information see the Secure Food Supply Plans.
- **Secure Zoo Strategy -** A tool for the exotic animal industry to assist with planning for foreign animal disease events, with goals of business continuity. Secure Zoo Strategy relies on work previously done in the agricultural sector, resulting in Secure Food Supply plans.
- **Sentinel Animals/Species** - a group of animals that may be used to detect disease in a timely and efficient manner. The suitability of a species to serve as disease sentinels depends on how easily that species might be handled, the susceptibility to disease by the species, how rapidly the species expresses disease signs, etc.
    - For more information see the NAHEMS Guidelines: Surveillance, Epidemiology, and Tracing.
- **Stamping Out -** The elimination of disease as rapidly as possible: this may involve the depopulation of infected animals to prevent excessive environmental contamination by disease agents. Stamping out was a strategy employed in the Highly Pathogenic Avian Influenza outbreaks in 2015 & 2016.
- **State Animal Health Official (SAHO) -** An employee at the state level with authority to manage disease events in their state. Usually a veterinarian or their representative.

- **Surveillance -** An intensive form of data recording that encompasses gathering, documenting, and analyzing data. Surveillance is information for action to eradicate or control a disease. Various processes of surveillance are discussed in Step 6.
    - For more information, including information on specific surveillance methods, see Step 6.
- **Traceability -** The process of investigating where diseased and at-risk animals are located, with the goal of preventing further spread of the disease.
    - For more information visit the Animal Disease Traceability page on the USDA website
- **Transboundary Diseases -** A synonym for Foreign Animal Disease. 'Transboundary' means that it may take the effort of several countries to eradicate the disease.
- **World Organisation for Animal Health (OIE) -** The OIE is an intergovernmental organization created by the International Agreement. In 2011, the OIE totaled 178 Member Countries and Territories. Among other objectives, the OIE seeks to safeguard world trade by publishing health standards for international trade in animals and animal products.
    - For more information visit the OIE website.
- **Zones -** Identification of a geographic area where specific disease response activities are implemented.
    - **Buffer -** Zone that immediately surrounds an Infected Zone or a Contact Premises.
    - **Control Area -** Consists of an Infected Zone and a Buffer Zone.
    - **Free Area -** Area not included in any Control Area. Includes the Surveillance Zone.
    - **Infected -** Zone that immediately surrounds an infected Premises.
    - **Surveillance -** Zone outside and along the border of a Control Area. The Surveillance Zone is part of the Free Area.
    - For more information see the USDA HPAI Ready Reference Guide – Overview of Zones.
- **Zoonotic Disease -** A disease spread between animals and people. Zoonotic diseases can be caused by viruses, bacteria, parasites, and fungi.
    - For more information visit the CDC website.