Veterinary Reservist Training:  
A Report on Veterinary Disease and Disaster 
Preparedness for the CVMA-CVR  

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"This report is the work of student veterinarians engaged by the CVMA/CVR to research animal disease and animal disaster response mechanisms around the world. While every effort has been made to ensure the accuracy of its contents, there may be errors and/or omissions. The reader is encouraged to view this report as a broad scope of disaster response for animals, and to seek clarification and further information through the various sources annotated throughout the document."
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1. INTRODUCTION

After the devastating consequences of Hurricane Katrina in the United States in 2005, there was a realization that animals need to be included in disaster preparedness and response plans. Many people suffered due to lack of consideration for their pets. As a result, the US Government amended legislation to include pets in evacuation plans. More national and state veterinary reservist programs were also developed. In Canada, the Canadian Veterinary Reserve (CVR) was developed in 2006 by the Canadian Veterinary Medical Association (CVMA) with the support and partnership of the Government of Canada through the Canadian Food Inspection Agency (CFIA). The CVMA-CVR consists of “Canadian veterinarians working in partnership with governments to provide medical expertise for animals in foreign animal disease outbreaks and large-scale disasters and emergencies.” The CVR is ready to deploy in the event of a major disease outbreak or civil emergency in Canada that requires a surge capacity of veterinarians.

This report provides information to developers of veterinary reservist training programs in Canada. The information was gathered online from programs presently existing in other countries. The first section describes some of the foreign animal diseases that Canadian reservists should be aware of. The second section details civil emergency programs and training available around the world. The last section addresses several specific civil emergency scenarios of interest that could impact Canadians.

2. FOREIGN ANIMAL DISEASE IN CANADA

2.1. Top 10 FAD List

2.1.1. Bovine Spongiform Encephalitis

Classification
Prion disease – Transmissible Spongiform Encephalitis
Reportable to OIE and CFIA

Description
Bovine spongiform encephalitis (BSE) is a progressive and fatal disease that targets the nervous system of cattle. It is a transmissible spongiform encephalopathy (TSE) that is related to scrapie, chronic wasting disease, and Creutzfeldt-Jakob disease. Its exact cause is still unclear, but it is associated with an abnormal protein called a prion. BSE is most commonly seen in cattle aged four to five years old, and it is always fatal once clinical signs appear. Because of its zoonotic potential, reported BSE outbreaks often lead to border closures, which, consequently, have great economic impacts on both the producer and the country affected. The long incubation period of BSE (four to five years) means that detection of the disease is difficult.
Distribution
Incidents of BSE have been reported in Canada, the U.S., Japan, Israel, and many European countries including: Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Liechtenstein, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom. BSE was found in Canada in 1993 in an imported beef cow. The animal was immediately destroyed and all precautions were taken to prevent Canadian cattle from being affected. Canada’s first case of BSE in a domestic herd occurred in 2003.

Clinical Signs
The clinical signs of bovine spongiform encephalitis include:
- nervous or aggressive behaviour
- abnormal posture
- lack of co-ordination and difficult rising from a recumbent position
- decreased milk production
- weight loss with an increased appetite

Transmission
BSE is transmitted when tissues containing the prion are ingested by animals or humans. There is little evidence supporting horizontal transmission of BSE between cattle, but offspring of infected animals have an increased risk of developing the disease – this route of transmission is unknown.

Some evidence suggests that when humans ingest the BSE prion, they develop variant Creutzfeldt-Jakob disease, which has a variable incubation period that can be up to 12 years long. The link between BSE and vCJD is still up for debate. Symptoms include anxiety, depression, insomnia, and neurological signs such as ataxia, incoordination, memory loss, slurred speech, tremors, and dementia. Most people die within six months to two years after the onset of clinical signs.

Control
There is no treatment or vaccine for BSE. The prohibition of using rendered material in animal feed has greatly reduced the number of reported cases. Moreover, the banning of tissues that have a high risk of transmitting BSE (brain, spinal cord, dorsal root ganglion, retina, and distal ileum) has reduced the zoonotic risk to humans.

2.1.2. Newcastle Disease

Classification
Family: Paramyxoviridae
Genus: Avulavirus
Reportable to OIE and CFIA
Description

Newcastle disease is a highly contagious viral disease of chickens, turkeys, and most other birds. The most severe form of the disease is characterized in chickens by high mortality, nervous signs and hemorrhagic and necrotic lesions in the gut mucosa. Once introduced into a flock, infection of all the birds will occur in two to six days. The disease can be mild, moderate, or very virulent depending on virus pathotype and species infected. The virulent form is sometimes called exotic Newcastle disease. It can be introduced to domestic birds from wild birds that do not appear ill.

Distribution

Newcastle disease is currently controlled in Canada, the US and parts of Western Europe. It continues to occur in Africa, Asia, and Central and South America. The last outbreak in Canada was in 1973. In 2002-2003, the U.S. had an incident of infection to chickens from game fowl, wild birds, or pet birds. Mexico had cases in 2001 in chickens kept as fighting cocks. Since 2006, Newcastle cases have been reported to OIE in Romania, Belgium, Romania, Israel, and Belize.

Clinical Signs

Newcastle disease can affect the respiratory, nervous, and gastrointestinal systems and cause the following clinical signs:
- decreased egg production
- depression
- diarrhea
- respiratory distress
- increased number of sudden deaths

Transmission

Newcastle disease is transmitted by direct contact with diseased or carrier birds. Disease may also be spread by contact with fecal contaminated food, water, equipment, clothing and other fomites. The virus survives for several weeks in the environment, especially in cool weather. Some species of birds without clinical disease may be reservoirs and carriers of the virus. Mutations may occur of less virulent pathotypes of the virus along with subsequent transfer to susceptible species. There is evidence of transmission of Newcastle disease to North American poultry from cormorants or smuggled pet birds.

Newcastle is a minor zoonotic disease that can cause mild and self-limiting conjunctivitis in humans. There is minimal risk of the general public contracting the disease. Farm and laboratory workers that handle sick birds and do not wear protective eyewear are at greater risk.

Control

Newcastle disease can be removed and controlled through strict quarantine, humane destruction of infected and exposed, cleaning and disinfection of premises, proper carcass disposal, pest control in flocks, depopulation followed by 21 days before restocking, avoidance of contact with birds of unknown health status, and control of access to poultry farms.
2.1.3. Rift Valley Fever

Classification
Family: Bunyaviridae
Genus: Phlebovirus

Description
Rift Valley fever is an acute arthropod-borne viral disease of domestic animals and humans. The disease has high morbidity and mortality rates, especially in young ruminants, kittens and puppies. The fever causes epidemic hepatitis in ruminants. Rift Valley fever is zoonotic and humans may acquire the virus through infected mosquitoes, blood or body fluid contact from infected animals, or by consumption of raw milk or uncooked meat from infected animals.

Distribution
Rift Valley fever is currently exclusively in Africa, including Madagascar. It is endemic to sub-Saharan Africa. Outbreaks were reported in Kenya in 1998, 2002, and 2007. Also in the Congo and Tanzania in 2007. Senegal had reported cases from 2001 to 2004. Saudi Arabia and Yemen had a reported outbreak in 2000. Egypt has implemented an extensive vaccination program and has not had an outbreak since 1993. Madagascar has had outbreaks in 1991. Outbreaks appear to be more common in dry areas after a period of heavy rainfall or flooding.

Clinical Signs
The clinical signs of rift valley fever include:
- fever
- abortions
- excess salivation
- inappetance
- nasal discharge
- weakness
- diarrhea

Transmission
Animals and humans can potentially introduce it into new areas by infecting mosquitoes. Some regions of Canada do contain mosquitoes that have the potential to transmit Rift Valley fever between animals and humans. However, the virus would first have to be introduced to the continent and be picked up by the mosquitoes.

Transmission to ruminants is by bloodsucking mosquitoes. Mosquitoes may transmit the virus into eggs that allow the virus to survive in the environment in a dried state for several years until flooding allows them to hatch. The virus may also be passed on to the fetus \textit{in utero}. Also mechanical vectors such as midges, sandflies, stable flies, and blackflies may spread the disease. Animals and humans may become infected through aerosols from blood, contact with
viscera of infected animals, or consumption of raw milk. The virus is not transferred from person to person.

Control

Prevention and control include surveillance, vector management, vaccination, and personal protective clothing or equipment. Canada has strict regulations on imports of animals from areas with Rift Valley fever.

2.1.4. Avian Influenza

Classification

Family: Orthomyxoviridae
Genus: Influenza A
Reportable to OIE and CFIA

Description

Avian influenza, or “bird flu” is a contagious viral infection that affects all bird species including poultry, pets, and wild birds. The virus is classified into low and highly pathogenic avian influenza, depending on its severity. Most avian influenza viruses are low pathogenic (LPAI) and cause little or no signs of illness in birds. In contrast, highly pathogenic viruses (HPAI) cause severe illness and death.

The virus can be further divided into subtypes based on two proteins that are present in the virus: hemagglutinin (“H” protein) and neuramidase (“N” protein). The H5 and H7 subtypes are of particular interest due to their ability to mutate from low pathogenic to highly pathogenic after infection of domestic birds. Moreover, different strains of a viral subtype can exist: the H5N1 strain present in Europe is low pathogenic, whereas the H5N1 strain in Asia is highly pathogenic.

Distribution

Avian influenza is found all over the world. In 2011 alone, it was reported in Bangladesh, Cambodia, Hong Kong, India, Indonesia, Israel, Japan, Korea, Mongolia, South Africa, and Vietnam. Within Canada, avian influenza was documented in Saskatchewan in 2007, British Columbia in 2009, and Manitoba in 2010. As of May 5, 2011, Canada regained disease-free status for notifiable avian influenza.

Clinical Signs

The clinical signs of avian influenza include:

- decreased egg production
- soft-shelled or shell-less eggs
- diarrhea
- hemorrhage on the hock
- increased and sudden mortality rate
- depression
swelling of skin under the eyes
swollen and congested wattles and combs

Transmission
Avian influenza is spread via direct contact with infected birds and poultry products; and contaminated fomites, such as manure, footwear, vehicles, feed, etc. Wild birds, particularly waterfowl, serve as natural reservoirs for the virus. Some virus strains are zoonotic and cause disease in humans. Contact with infected poultry, uncooked poultry products, contaminated manure and fomites contribute to the virus’s zoonotic potential.

Control
The use of strict biosecurity protocols is important in the control of avian influenza. In order to prevent the introduction of the virus into a poultry herd, it is recommended that farmers: keep poultry flocks separated from wild bird populations, limit human access to the flock, and clean and disinfect equipment. It is recommended that people working with poultry wear personal protective equipment to prevent transmission of the virus.

2.1.5. Foot and Mouth Disease

Classification
Family: Picornaviridae
Genus: Apthovirus
Reportable to OIE and CFIA

Description
Foot-and-mouth disease (FMD) is a highly contagious viral disease that affects cloven-hoofed animals including cattle, sheep, swine, goats, deer, and bison. Although the disease is rarely fatal in adult animals, the morbidity rate is close to 100% in susceptible populations. While the majority of infected animals recover, they are often left weak and debilitated, resulting in decreased production and significant economic impacts. There are 7 viral strains and each requires a specific vaccine to provide effective immunity.

Distribution
FMD is endemic in many parts of Asia, Africa, and the Middle East. Many countries, including Canada, are considered to be free of FMD. The last outbreak of FMD in Canada was in 1952.

Clinical Signs
The clinical signs of foot-and-mouth disease include:
- depression
- fever
- blister-like sore on the tongue, lips, mouth, teats, and between hooves
- foot lesions leading to acute lameness
inappetance
- decreased milk production

Transmission
The virus is spread directly by contact with infected animals, indirectly by contact with contaminated fomites, and by inhalation. Airborne transmission occurs when infected animals exhale large amounts of virus into the air; this commonly occurs with swine. Due to Canada’s routine movement of livestock, and outbreak of FMD could spread rapidly across the country unless detected early and eradicated immediately. The role of wildlife reservoirs in the transmission of FMD is unclear.

Human cases of FMD are rare and generally mild, and occur by consuming infected milk or direct contact with FMD blisters. It should be noted that FMD is an animal disease that is not related the human disease Hand, Foot, and Mouth disease caused by the Coxsackie virus.

Control
FMD can be introduced into Canada from the transportation of infected animal products; thus its spread can be prevented through the implementation of strict biosecurity measures. New animals should be held in isolation for a period of time before being introduced to the herd. Workers and visitors should wear clean clothes and boots that are designated for use in a specific barn only. Vehicles and equipment should be cleaned and disinfected properly before entering and leaving the farm.

2.1.6. Classical Swine Fever (Hog Cholera)

Classification
Family: Flaviviridae
Genus: Pestivirus
Reportable to OIE and CFIA

Description
Classical swine fever (CSF) is also known as hog cholera and is a highly contagious viral disease of domestic and wild swine. Disease severity can range from unapparent to highly fatal. Low virulence can reduce reproductive performance. The disease has a 100% mortality rate, occurring within two weeks.

Distribution
CSF was first detected in the US in Nineteenth Century. An outbreak occurred in the Netherlands in 1997 that resulted in the destruction of 11 million pigs at a cost of $2.3 billion. There were also outbreaks in Germany, Belgium, and Italy in the 1990s. Since 1990, the disease has been found in Mexico, Central and South America, mainland Europe, Russia, Asia, Indonesia, and parts of Africa. CSF has been eradicated in North America and most of Western Europe. It does currently exist in Hungary and Russia and reoccurred in Croatia in 2006-2008.
Clinical Signs

The clinical signs of classical swine fever include:

- inappetance, high fever, and depression
- conjunctivitis and nasal discharge
- lack of co-ordination, stiffness, and convulsions
- vomiting and diarrhea
- laboured breathing
- red or purplish skin blotching on the ears, snout, limbs, and abdomen
- abortions, stillbirths, or non-viable fetuses in pregnant sows.

Transmission

CSF is mainly transmitted by direct contact between swine or with infected saliva, secretions, urine, feces, semen, and blood. The virus can spread widely by ingestion, inhalation, genital infection, or wound contamination. Pigs shed virus for considerable periods. The virus may remain viable for prolonged periods under favourable conditions in pork and processed pork products. It can survive in products for months under refrigeration or for years if frozen. Pigs can become infected through feed (swill) containing these pork products, especially if it has not been adequately heated beforehand. The virus can also be spread by contaminated fomites such as vehicles, pens, feed or clothing or by vertical transmission to offspring. Some contagious animals may be persistently infected without any clinical signs. There is evidence of wild boars in Europe playing a role in spread of the disease. There is no human health risk associated with CSF.

Control

Disease eradication involves early detection, movement control, proper disposal of carcasses, and cleaning and disinfection. Vaccinations are also available. The virus is inactivated by cooking and sensitive to drying and UV light.

2.1.7. African Swine Fever

Classification

Family: Asfarviridae
Genus: *Iridovirus*
Reportable to OIE and CFIA

Description

African swine fever (ASF) is a highly contagious and tick-borne hemorrhagic disease of domestic and wild swine. High virulence causes death in 2-10 days at a mortality rate as high as 100%. The portal of entry is tick bite or oral.

Distribution

ASF is enzootic to sub-Saharan Africa. It first appeared in 1960 in Spain, Portugal and Sardinia and still remains in Sardinia. Severe epidemics occurred in the Caribbean and Brazil in
the 1970s to early 1980s. In the 1980s limited outbreaks that were eradicated occurred in Cuba, Italy, Belgium, and Netherlands. It appeared in 2007 in Georgia, Armenia, and Russia. The disease continues to be present in Russia. Cases were reported in Namibia in 2009.

Clinical Signs

The clinical signs of classical swine fever include:
- inappetance, high fever, and depression
- conjunctivitis and nasal discharge
- lack of co-ordination and stiffness
- convulsions
- vomiting and diarrhea
- laboured breathing
- red or purplish skin blotching on the ears, snout, limbs, and abdomen

Transmission

ASF can spread by direct or indirect contact between swine since blood and secretions contain abundant amounts of virus. The virus is also spread by biting insects, contaminated premises, vehicles, equipment, and clothing. In Africa, the disease is maintained in a sylvatic cycle of wild Suidae and argasid ticks (*Ornithodoros* sp). The virus is mainly spread by the soft tick *Ornithodoros* from the warthog natural reservoir to domestic pigs. The virus can multiply in the ticks. Transmission also occurs by feeding of uncooked or minimally cooked garbage containing virus-infected pork products to domestic pigs. The virus remains infectious for 3-6 months in uncooked products such as sausage, chorizo, and dry hams. The virus remains infectious for several years in frozen carcasses and products. It can survive in salted dried hams for 140 days and in bone meal stored at 39°C for 15 days. There is no human health risk associated with ASF.

Control

Control measures in endemic areas involve tick vector control and not feeding pork products to other pigs. Disease eradication involves early detection, movement control, proper disposal of carcasses, and cleaning and disinfection. The virus is resistant to low temperatures but inactivated by heating.

### 2.1.8. Vesicular Stomatitis

Classification

Family: Rhabdoviridae
Genus: *Vesiculovirus*
Reportable to OIE and CFIA

Description

Vesicular stomatitis is a viral disease that affects swine, ruminants, and horses. Its characteristic lesions resemble those of foot-and-mouth disease; thus, laboratory testing is
required to diagnose it. The virus has 2 distinct immunological classes and one class has three different subtypes. Sources of the virus include saliva and epithelium of open vesicles of infected animals, arthropod vectors plants, and soil. The disease causes discomfort in affected animals, and can lead to market loss, which economically impacts the producer. The morbidity rate of VS varies from infection to infection, but can reach up to 90%, and the mortality rate is very low. Recovery occurs in three to four days.

Distribution

VS was last reported in Canada in 1949 and has not been diagnosed since. It is generally limited to the Americas, but was described in South Africa in the late 1800s and in France in the early 1900s. Specific strains are endemic in southern Mexico, Central America, Venezuela, Colombia, Ecuador, and Peru. Other strains have been reported in northern Mexico, western United States, Argentina, and Brazil. VS is endemic in the feral pig population on Ossabaw Island in Georgia.

Clinical Signs

The clinical signs of vesicular stomatitis include:
- inappetance
- fever
- blister-like lesions on the mouth, lips, nose, hooves, and udder
- raw, sore areas where blisters have ruptured
- profuse salivation
- lameness, particularly in swine
- decreased milk production in dairy cows

Transmission

VS is transmitted by consumption of or contact with substances contaminated with saliva or fluid from lesions of infected animals. Milking procedures in dairy cattle can spread the disease through the herd. In warm, temperate climates, the following arthropod vectors play a role in the transmission of the disease: sand flies (Phlebotomus, Lutzomyia spp.), mosquitoes (Aedes spp.), and black flies (family Simuliidae).

VS has a minor zoonotic potential and can infect humans that come in contact with infected animals. It causes influenza-like symptoms in humans, and it is recommended that farm and laboratory workers wear personal protective equipment when handling infected animals and animal samples.

Control

There is no treatment for VS; however antibiotics can be prescribed to prevent secondary infections. Recommended control measures include: restricted and controlled animal movement with mandatory quarantine times; insect control; and proper cleaning and disinfection of the premises, vehicles, and equipment.
2.1.9. Bluetongue

Classification
Family: Reoviridae
Genus: Orbivirus
Reportable to OIE; U.S. forms immediately notifiable to CFIA; virus serotypes exotic to the U.S. are reportable to CFIA.

Description
Non-contagious insect transmitted viral disease of wild and domestic ruminants. Disease severity varies: it is usually asymptomatic or subclinical in cattle, goats, and many sheep breeds. Specific sheep breeds and white-tailed deer show clinical symptoms. Susceptible sheep breeds experience weight loss, disruption in wool growth and potentially death. Mortality averages 2-30% but can be up to 70%. Sheep in endemic areas are generally resistant to bluetongue.

Distribution
Bluetongue was first described in South Africa in wild ruminants. It occurs in Africa, Asia, Australia, Europe, North America and several tropical islands. Outbreaks in 1940s and 1950s resulted in deaths of thousands of sheep. Since 2005, bluetongue has been reported to the OIE in many European countries, Algeria, Morocco, and Tunisia. The majority of European cases have been in Germany and Belgium where it is now endemic. Northernmost incidence of the disease was diagnosed in Netherlands in 2006 and the disease appears to be moving northward. To date bluetongue has been found up to latitude 50N in Europe and North America, but it is generally between 40°N and 35°S. In Canada, midges that can transmit bluetongue occur in the Okanagan Valley of BC and southern Alberta, Saskatchewan and Manitoba. Disease cases diagnosed in BC are believed to have been as a result of wind drifted midges from infected areas in the U.S. The bluetongue carrying midges likely do not survive over winters in Canada. Bluetongue is no longer monitored in the U.S. as of 2007, allowing higher risk of transmission north over the border.

Clinical Signs
The clinical signs of bluetongue include:
- fever
- reddening of the lining of the mouth and nose and swelling of the lips and gums
- swelling and purple-discolouration of the tongue
- difficulty swallowing and breathing
- lameness

Transmission
Bluetongue spreads by insect vector transmission by *Culicoides* species biting midges. Less than 20 of the 1000 species are considered capable of spreading bluetongue. The virus is maintained only if the biting midges are able to survive over winter. The disease can be spread
to new locations through wind movement of midges or introduction of infected sheep. There is no spread directly between animals. The virus can be vertically transmitted to the fetus. Bluetongue poses no human health risk.

Control
Prevention of bluetongue occurs by active surveillance programs and control by quarantine, movement restrictions, vaccinations, and insect control. The disease has an economic impact on loss of trade, high costs of surveillance, health testing and vaccination.

2.1.10. Swine Vesicular Disease

Classification
Family: Picornaviridae
Genus: Enterovirus
Reportable to OIE and CFIA

Description
Swine vesicular disease (SVD) is a contagious viral disease that affects pigs. It varies in severity with young animals being more severely affected. Recovery occurs within 1-3 weeks, with little or no mortality. The characteristic lesions of SVD are undistinguishable to the naked eye from those caused by foot-and-mouth disease, and laboratory tests are required for a diagnosis.

Distribution
SVD is occasionally reported from some European countries; it is commonly reported from southern and central Italy. It is also present in eastern Asia. SVD has never been found in Canada.

Clinical Signs
The clinical signs of swine vesicular disease include:
- inappetance
- fever
- sudden lameness, limping, and refusal to move on hard surfaces
- vesicles on the snout, feet, mouth, tongue, and teats
- vesicular ruptures causing erosive lesions
- loosened footpads or hoof loss

Transmission
SVD is spread through direct contact with infected swine or a contaminated environment (the virus is extremely resistant in the environment). The virus infects swine via open wounds in the skin and mucosa, inhalation, and ingestion. The virus survives in pork and processed pork products, and thus contaminated food scraps will transmit the virus to other
swine. The movement and transportation of infected animals is the primary means by which the virus spreads.

There is no apparent risk to human health, although rare cases of accidental infection have occurred in laboratory personnel.

Control

There is no treatment or vaccine for SVD; thus, other control measures must be implemented to prevent the spread of the disease. Such measures include: proper disinfection of the premises, equipment, and vehicles; strict import requirements and quarantines for transported animals; elimination of infected and contact pigs; and on-going surveillance and testing programs. In addition, contaminated pork, pork products, and garbage should not be fed to animals in order to prevent the spread of SVD.

2.2. Risk Assessment

2.2.1. Risk Assessment Matrix

The ten foreign animal diseases described in this report were chosen as the focus because of their potential to impact animals and people in Canada. Table 2-1 describes the major characteristics of the diseases taken into consideration in order to decide which might be of greater importance. Diseases that are zoonotic and/or easily transmissible are considered to be of increased concern to human health. Diseases that do not currently occur in Canada but can be carried by vectors that live here, need to be considered. Those transmissible diseases that are also highly pathogenic or fatal to livestock can have severe economic impacts for producers. These characteristics categorized into zoonotic potential, number of species affected, modes of transmission, severity, and economics were then subjectively graded on a scale of no impact (0) to very significant (++++) A summation of each category for each disease then allowed a ranked listing of the diseases as shown in Table 2-2.

Table 2-1. Alphabetical list of ten FADs and important characteristics.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Zoonotic</th>
<th>Species</th>
<th>Transmission</th>
<th>Severity</th>
<th>Economics</th>
</tr>
</thead>
<tbody>
<tr>
<td>African swine fever</td>
<td>no</td>
<td>swine</td>
<td>oral, tick vector, warthog reservoir, fomites, pork products</td>
<td>high mortality</td>
<td>swine depopulation</td>
</tr>
<tr>
<td>Avian influenza</td>
<td>yes, some strains</td>
<td>avian</td>
<td>direct, fomites</td>
<td>low to highly pathogenic</td>
<td>poultry depopulation</td>
</tr>
<tr>
<td>Bluetongue</td>
<td>no</td>
<td>ruminants</td>
<td>midge vector</td>
<td>subclinical to clinical; worse in certain sheep breeds</td>
<td>production loss; some sheep loss</td>
</tr>
<tr>
<td>Bovine spongiform encephalitis</td>
<td>yes</td>
<td>cattle</td>
<td>ingestion of prions</td>
<td>fatal</td>
<td>depopulation</td>
</tr>
<tr>
<td>Disease</td>
<td>Zoonotic</td>
<td>Species</td>
<td>Transmission</td>
<td>Severity</td>
<td>Economics</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>----------</td>
<td>--------------------</td>
<td>--------------</td>
<td>----------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Classical swine fever</td>
<td>no</td>
<td>swine</td>
<td>direct, secretions, pork products, fomites</td>
<td>fatal in 2 weeks</td>
<td>swine depopulation</td>
</tr>
<tr>
<td>Foot and mouth disease</td>
<td>rarely</td>
<td>cloven-hoofed</td>
<td>direct, fomites, airborne</td>
<td>high morbidity</td>
<td>decreased production</td>
</tr>
<tr>
<td>Newcastle disease</td>
<td>yes, minor</td>
<td>avian (esp. cormorants)</td>
<td>direct, fomites</td>
<td>mild to fatal</td>
<td>poultry depopulation</td>
</tr>
<tr>
<td>Rift Valley fever</td>
<td>yes</td>
<td>domestic animals</td>
<td>mosquito vector, body fluids, ingestion</td>
<td>high morbidity and mortality, especially in young</td>
<td>probably requires depopulation</td>
</tr>
<tr>
<td>Swine vesicular disease</td>
<td>no</td>
<td>swine</td>
<td>direct, pork products</td>
<td>recover in 1-3 weeks - must distinguish from FMD</td>
<td>temporary market losses</td>
</tr>
<tr>
<td>Vesicular stomatitis</td>
<td>no</td>
<td>swine, ruminants, equine</td>
<td>saliva, lesions, arthropod vectors</td>
<td>mild - must distinguish from FMD</td>
<td>market losses</td>
</tr>
</tbody>
</table>

Table 2-2. Ranking of ten FADs based on relative importance of characteristics.

2.3. Recommended Veterinary Core Curriculum

USDA Recommendations
The federal reserve system can provide a method for private veterinary practitioners to become accredited as government representatives to assist in regulatory activities. These activities could include animal identification, inspection and certification; control of animal movement; or disease surveillance, testing, reporting, and control. All accredited veterinarians should possess 16 core competencies as identified by the USDA. Training in vet colleges should include these subjects and skills. There should be teaching of reportable foreign animal diseases and animal health emergency management. Veterinarians should know how to recognize and
control reportable diseases as well know the protocol of reporting them. They should also keep up to date on the biology and behaviour of emerging diseases to keep awareness up. Veterinary students should learn about biosecurity measures and personal protective equipment. They should be aware of movement restrictions across borders. The core tasks that accredited veterinarians should be able to perform are (US Department of Homeland Security 2011):

1. Perform physical examinations of individual animals and visually inspect herds or flocks to determine whether the animals are free from any clinical signs suggestive of communicable disease.
2. Recognize the common breeds of livestock so as to be able to record breed information on official documents.
3. Recognize brucellosis tattoos and calfhood vaccination tags and determine the state of origin of ear tags to properly identify animals in interstate commerce.
4. Estimate the age of livestock by means of a dental formula.
5. Apply an eartag, tattoo, back tag, and leg band.
6. Certify the disease status of a poultry flock with regard to diseases such as salmonellosis, chlamydiosis, and exotic Newcastle disease by evaluating records of the flock’s participation in federal and state poultry health programs.
7. Properly complete certificates for domestic and international movement of animals.
8. Apply and remove official seals.
9. Perform a necropsy on livestock.
10. Recognize clinical signs and lesions of exotic animal diseases.
11. Plan a disease control strategy for a livestock unit.
12. Vaccinate for brucellosis and fill out the vaccination certificate.
13. Draw and ship blood for testing.
14. Perform a caudal fold test for tuberculosis.
15. Develop appropriate cleaning and disinfection plans to control the spread of communicable disease in livestock.
16. Explain basic principles for control of diseases, such as brucellosis, pseudorabies, and tuberculosis, for which Animal and Plant Health Inspection Service and state cooperative control programs exist.

Our Recommendations

Integrating the above recommendations with our own knowledge of foreign animal disease outbreaks, we recommend the following be included as the core curriculum for the veterinary schools in Canada:

1. General description and classification of the top 10 FADs
   It is important that recently graduated veterinarians have a general idea about each disease. Classification and general characteristics of the organism (e.g. if a bacterium is gram negative or positive) are important, but fine details are not necessary (e.g. the different viral proteins and how they interact) because we are training clinicians and not virologists or bacteriologists.
2. Species affected, transmission, and zoonotic potential
   New graduates should be aware of what species can be affected by each of the 10 FADs and how they are transmitted within a species and between different species. Knowledge
in this area will help to control the spread of the disease and identify vulnerable populations. Moreover, it is important to know the zoonotic potential so that people involved in dealing with an outbreak can be best protected and measures to protect the general public can be implemented.

3. Clinical signs
   Since recently graduated veterinarians could be the clinicians on the frontlines dealing with an outbreak, it is important that they identify the disease and confirm its presence or absence in a herd through various diagnostic testing. As such, the veterinarian core curriculum should include the pertinent clinical signs and how to test for each of the top 10 diseases.

4. Diagnostics
   New veterinary graduates should be able to perform various clinical skills including: individual animal and herd physical exams; perform diagnostic tests that allow for identification of a specific disease; and perform necropsies to determine the cause of death.

5. Treatment
   Treatment protocols for each of the top 10 FADs are a fundamental part of dealing with any disease outbreak. As a result, new graduates should be aware of these protocols.

6. Prevention and control
   Controlling a disease outbreak and implementing measures to prevent future outbreaks are something that new graduates should be aware of so that when they are dealing with an outbreak, they can impart this knowledge on producers to help them in the future.

7. Biosecurity measures
   New graduates should be aware of biosecurity measures that are implemented during a disease outbreak so that they help prevent the spread of the disease further.

2.4. References


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3. CIVIL EMERGENCIES

3.1. International Standards

3.1.1. Legislation and Guidelines

Livestock Emergency Guidelines and Standards
The Livestock Emergency Guidelines and Standards (LEGS) are “a set of international guidelines and standards for the design, implementation and assessment of livestock interventions to assist people affected by humanitarian crises (LEGS Project 2009).” LEGS is aimed at NGOs, agencies and governments involved in interventions where livestock are important for livelihoods. LEGS aims to bring a livelihoods perspective to disaster relief of livestock and does not provide detailed practical guidance for interventions.

World Organisation for Animal Health
The World Organisation for Animal Health (OIE) currently has International standards on animal welfare that currently address care of farm animals during transport and at slaughter (Roeder 2009). In 2007, they adopted a resolution in support of the Universal Declaration on Animal Welfare (UDAW) that states that:
- animals are sentient beings and can suffer,
- we must respect their welfare needs, and
- animal welfare benefits animals, people and the environment

3.1.2. Organizations

WSPA Member Society Network
The WSPA Member Society Network is the largest international alliance of animal welfare organisations in the world, with more than 900 member societies in over 150 countries. Along with the United Nations Educational, Scientific, and Cultural Organization (UNESCO), WSPA co-chairs an International Working-group on Animals in Disasters (IWGAID). The IWGAID involves groups primarily focused on human welfare (such as the International Federation of Red Cross & Red Crescent Societies (IFRC) and the World Health Organization (WHO)) together with those focused on animal welfare (such as WSPA and the World Organization for Animal Health). The current Co-chairs are the United Nations Affairs Director of WSPA, Larry Winter Roeder, and the Chief of the Section for Disaster Reduction at UNESCO, Dr. Badaoui Rouhban. The IWGAID is a body of experts in disaster management, humanitarian relief and animal welfare from the World Organization for Animal Health (OIE), the United Nations Nuclear Energy Agency of the Organization for Economic Cooperation and Development (OECD), and the World Society for the Protection of Animals (WSPA). They produced the publication “Protecting Animals From Disasters” in 2008. They work in consultation with the other concerned organizations mentioned above as well as:
- FAO
- International Strategy for Disaster Reduction
WSPA is internationally recognised as the leader in management of animal welfare during natural disasters. They work on disaster management response and risk reduction. They produce Disaster Assessment Needs Analysis (DANA) reports on deployments they make. WSPA employs several disaster management veterinarians including James Sawyer, their head of disaster management in the UK. He is a fellow of the Royal Geographical Society and has managed overseas operations across five continents and led 12 expeditions to remote regions.

WSPA’s work is focused on four priority animal welfare areas:

- Companion animals – responsible pet ownership, humane stray management and cruelty prevention.
- Commercial exploitation of wildlife – intensive farming and the cruel management and killing of wild animals for food or by-products.
- Farm animals – intensive farming, long distance transport and slaughter of animals for food.
- Disaster management – providing care to animals suffering as a result of man-made or natural disasters, and thereby protecting people’s livelihoods.

With respect to disaster management, the WSPA has dedicated operations teams based in Asia and Latin America. They also work with governments, local animal welfare groups and communities to reduce risk in disaster prone areas. They help set up national warning systems and show people how to prepare for disasters. They teach animal owners and caretakers to create adequate storage and protection for food and water supplies and to identify animals so they can easily be reunited with them. They are able to evacuate animals safely, strengthen and secure animal shelters on safe ground, and run vaccination programs.

When disaster strikes, the WSPA provides emergency relief for animals within days. They provide veterinary care through static and mobile clinics, feed hungry animals and reunite animals with their owners wherever possible. Vet assistance is provided through local Veterinary Emergency Response Units (VERU). They have been doing this for more than four decades and work with local partners and humanitarian agencies, to deliver the right type of help. Post-disaster, the WSPA works to get living conditions back to normal as much as possible as quickly as possible. This includes restoration of local veterinary care and implementation of risk reduction programs for future incidents.

The Royal Society for the Prevention of Cruelty to Animals (RSPCA) based in the United Kingdom has a mission to “by all lawful means, prevent cruelty, promote kindness to and alleviate suffering of all animals.” They also have been doing international work for over 150 years. This includes assisting in emergency response during civil emergencies in over 20 countries.

Humane Society International

Humane Society International (HSI) works with local and international organizations to provide relief to animals and communities impacted by natural and man-made disasters occurring around the world. In Haiti, after the January 2010 earthquake, they put their
resources into assisting with long-term infrastructure development and capacity-building programs. Their goal was to have a veterinary disaster response team ready to deploy and assist next time it is needed.

The HSI often partners with Best Friends Animal Society in response to disasters. Best Friends is the largest no-kill shelter in the United States of America. They are able to set up spay/neuter, shelter, foster and adoption programs in neighbourhoods, cities, and states throughout the country. Best Friends has led some of the largest animal rescue efforts in recent history. These rescues include natural disasters like Hurricane Katrina, wartime situations, and animal hoarding or failed shelter situations where hundreds of dogs and cats need urgent and continuing care for many months before they can be placed in new homes. With its sanctuary and rescue experience, Best Friends claims to be the only organization in the country capable of mounting such major rescue efforts.

**International Fund for Animal Welfare**

The International Fund for Animal Welfare (IFAW) is the world’s leading organization in campaigning for animal welfare. During major disasters, IFAW works with communities to alleviate suffering, save lives and educate for the future. IFAW’s Emergency Response Team is ready to conduct search and rescue operations, relocate animals, and attempt to reunite them with their people. They are able to work with local humane societies to provide supplies, shelter assistance and financial grants. They also provide vaccination and treatment services.

**World Vets**

World Vets is “a non-government organization (NGO) providing veterinary aid around the globe, in collaboration with animal advocacy groups, foreign governments, U.S. and foreign military groups and veterinary professionals abroad.”

### 3.1.3. Formal Training

**WSPA Animal Welfare Disaster Management Course**

The WSPA Animal Welfare Disaster Management Course was held in Costa Rica during 7–13 April 2008. This course was the first time that WSPA had invited non-WSPA staff to participate. A Disaster Response Technical Training Course was also provided by WSPA in November 2007. The objectives for course are to:

- understand response options to different core disasters and recommended best practice response including veterinary remedial action; and
- gain an awareness of technical rescue techniques and the dangers disaster operations pose to responders.

**UC Davis International Animal Welfare Training Institute**

The UC Davis Veterinary Medicine department has an International Animal Welfare Training Institute (IAWTI). Members of the UC Davis faculty formed IAWTI to promote animal welfare issues. The group includes representatives for livestock, horses, wildlife and companion
animals. Their aim is to improve animal wellbeing through unbiased research and education. The hierarchy of the organizations involved are shown in Figure 3-1.

Figure 3-1. International Animal Welfare Training Institute Hierarchy (UC Davis).

Humane Society International

The Humane Society International provided a veterinary response team training course to Haitians in April 2011 to better prepare them in the event of another major disaster. It consisted of a series of technical animal rescue courses for a group of 12 Haitian veterinarians. They were trained in the use of safety and response equipment for both rope and water rescue. They also had classroom presentations, team-building exercises, and actual drills. They learned technical animal rescue techniques such as retrieval from a ravine by harness. They also worked on teamwork and non-verbal communication skills.

3.1.4. Deployments

Japan Earthquake, March 2011

The recent earthquake and tsunami in Japan hit on March 11, 2011. The Japan Earthquake Animal Rescue and Support (JEARS) Coalition was formed by four dedicated shelter owners across Japan: David Wybenga and Susan Roberts of Japan Cat Network in Shiga, Susan Mercer of HEART Tokushima, and Isabella Gallanon-Aoki of Animal Friends Niigata. They are a coalition created to support rescue efforts for the animals affected by the devastating earthquake. They are a “no-kill coalition of numerous volunteers who have put aside their own terror and
confusion to help.” They used their own funds to be pay for veterinary care including vaccines, microchips, antibiotics and other medicines, food, cages, and costs of transporting animals.

The WSPA also took action in Japan. Many families lost animals, were forced to leave them behind, or took them to evacuation centres with limited space, food and water. WSPA launched an appeal and coordinated effort for the post-disaster care of Japan’s animals to raise funds and to help cover the critical recovery period in the aftermath of the disaster. Funds were directed towards the set up of 30 temporary shelters near the human shelters via the Animal Disaster Response Team (ADRT). The ADRT is a coalition of local animal groups, including WSPA’s local member society, the Japan Animal Welfare Society (JAWS). The WSPA first arrived in Japan just four days after the earthquake to assess the potential need for their services. Their initial assessment via the Disaster Assessment Needs Analysis (DANA) estimated that about 30,000 pets were affected in worst hit regions. An unknown number of pets and livestock had to be abandoned in the exclusion zone around the Fukushima nuclear power station after immediate orders to evacuate. Most owners took their pets to the evacuation centres. Many pets not evacuated likely died in the tsunami.

Last Chance for Animals (LCA), based out of California, went to Japan to retrieve animals from just outside the nuclear exclusion zone. They made short visits with radiation monitoring. The animals they found were taken to shelters like Animal Friends Niigata.

World Vets deployed a first-responder team to Japan March 15 to collaborate with a coalition of Japanese animal welfare groups and international aid organizations. Their goal was to make an assessment of the current resources available, the animal-related needs that exist and how best World Vets is able to assist animal rescue and sheltering efforts. World Vets then sent in veterinarians to work 12 hour days to provide care to animals in shelters. They also established a protocol for treating and de-contaminating animals rescued from within the radiation zone. They also sent large shipments of pet food, collapsible cages, kennels and vet supplies to Japan from the US.

Haiti Earthquake, January 2010

The 7.0 magnitude earthquake hit Haiti on January 12, 2010 just 25 km from the capital city Port-au-Prince. The Animal Relief Coalition for Haiti (ARCH) was jointly led by the World Society for the Protection of Animals (WSPA) and the International Fund for Animal Welfare (IFAW) in partnership with over a dozen other organizations. These included the American Humane Association, Best Friends Animal Society, Royal Society for the Prevention of Cruelty to Animals (UK), In Defense of Animals, American Veterinary Medical Association, American Veterinary Medical Foundation, Antigua and Barbuda Humane Society, American Society for the Prevention of Cruelty to Animals, United Animal Nations, Kinship Circle, One Voice, Swiss Animal Protection, Palo Alto Humane Society (PAHS), Finnish Federation for Animal Welfare Associations, Petfinder.com Foundation, Last Chance for Animals, and Animal Medical Care Foundation (AMCF). The coalition members had extensive experience in caring for injured, homeless, diseased, or starving animals. Their rescue and recovery efforts were always authorized and coordinated with local government and international relief agencies. A video of some of their efforts to vaccinate animals to reduce the spread of disease between animals and to humans is at: http://www.youtube.com/watch?v=9n030-Y8aKY. Dr. Jean Francois Thomas, a veterinarian in Haiti for more than 20 years, and the coalition trained a local team of three
veterinarians, three vet technicians and two security personnel. Using a mobile veterinary clinic, the team traveled into earthquake-stricken neighborhoods and provided aid and vaccinations to over 50,000 dogs, cats, goats, cattle, horses and other animals over the period of one year.

**Lebanon War, July 2006**

A 34-day conflict between Israel and Hezbollah paramilitary in Lebanon in July 2006 affected many innocent people and animals. Best Friends Society came in to assist Beirut for the Ethical Treatment of Animals (BETA) in rescuing animals from war zones and caring for abandoned ones when their numbers of sheltered animals more than doubled in less than two months reaching 237 dogs and 205 cats. Best Friends provided on the ground support as well as finances and moral support. Best Friends took in 300 of the rescued animals (150 cats and 150 dogs) and for adoption in the U.S.

### 3.1.5. References


### 3.2. Standards in Developed Countries

#### 3.2.1. Australia

##### 3.2.1.1. Legislation and Guidelines

**Welfare Legislation**

Welfare legislation in Australia falls under the jurisdiction of each state and territory government, and thus numerous welfare laws and guidelines exist. In general, the laws deal with traditional welfare issues, including transport of livestock, housing conditions, etc. None of
the laws or guidelines discusses how to deal with animals during civil emergencies. The Australian Animal Welfare Strategy (AAAWS) is a national program that aims for nationally consistent policies across the states and territories.

Emergency Animal Disease Response Agreement

The Emergency Animal Disease Response Agreement (EADRA) is a mutual agreement between the Commonwealth, states governments, territory governments, and various livestock industry groups to increase Australia’s capacity to prepare for an animal disease outbreak. It provides a great framework for dealing with emergency animal diseases that could be easily applied to a civil emergency scenario.

Dairy Australia

Dairy Australia, together with various other partners, developed guidelines for dairy producers on how to deal with extreme weather situations, including bushfires, hot conditions, wet conditions, and floods. They produced a “prepare your dairy farm for fire threat” toolkit that allows producers to create their own fire-preparedness plan. The toolkit includes an instructional video that can be found on their website at http://www.dairyaustralia.com.au/Animals-feed-and-environment/Environment/Extreme-weather/Preparing-for-fire-threats.aspx.

3.2.1.2. Organizations

3.2.1.2.1. Governmental

Animal Health Australia

Animal Health Australia (AHA) is a group made up of the Australian Government, state and territory governments, major livestock industries, and various other stakeholders. Their aim is to improve Australia’s national animal health system and instill confidence in the safety and quality of livestock products for both domestic and overseas markets. Their main focus is farm biosecurity and emergency animal disease preparedness. They were involved in the development of the Emergency Animal Disease Response Agreement (EADRA), discusses above.

Animal Health Committee

The Animal Health Committee (AHC) is part of the National Biosecurity Committee (NBC) and reports to the Primary Industries Standing Committee (PISC). Members include the Commonwealth, state and territory governments, New Zealand, and various other representatives. Their goal is to develop and implement “science-based and nationally consistent” policies and programs that deal with animal health issues.

Australian Veterinary Reserve

The Australian Veterinary Reserve (AVR) was established under the recommendations of the Review of Rural Veterinary Services in order to realize the potential of a national veterinary resource. It was set up in May 2004, at the Australian Veterinary Association Conference (AVAC). It has 100 non-government veterinarian members and provides paid training in national emergency animal disease preparedness. The AVR is open to all private sector practitioner vets and aims to “complement existing government resources, develop business
diversity for rural practitioners and provide opportunities for better integration of veterinary services”.

**Australian Army Veterinary Corps**

The Australian Army Veterinary Corps (AAVC) was a part of the Australian Army from 1909 till 1946. During the Boer War in South Africa (1899), World War I and World War II, Australian veterinarians were deployed to look after the thousands of horses that were used as a primary means of transport during the wars.

**International Stabilisation Force**

The International Stabilisation Force (ISF) is a branch of the Australian Army. Several articles refer to ISF-trained veterinarians that have been involved in animal-related sustainability initiatives in developing countries such as East Timor. Unfortunately, further searches on the ISF, including the Australian Army’s website, yielded no detailed information on the group, the training it offers veterinarians, or the relief work they are involved in.

**Disaster Assist**

Disaster Assist is an initiative of the Australian Government that provides information on how to get assistance during natural disasters. There are currently no protocols that involve animal disaster relief.

**New South Whales State Emergency Service**

The NSW State Emergency Service (SES) is an emergency and rescue service aiding the community. It consists mostly of volunteers, and has 228 units (with 10,000 volunteers in each) located throughout New South Wales. Their main focus is rescue relied during flood and storm emergencies, but they also provide general rescue in rural parts of the state, including: “road accident rescue, vertical rescue, bush search and rescue, evidence searches (both metropolitan and rural) and other forms of specialist rescue [including animals] that may be required due to local threats”. Volunteers are trained as “Community First Responders” and help to support full-time emergency services during major disasters. Their 2010 annual report indicates rescues that have involved animals.

**3.2.1.2.2. Non-governmental**

**AgriFood Skills Australia**

AgriFood Skills Australia is an “Industry Skills Councils” that provides industry knowledge on skills that are required for training in the agrifood industry. It is a public company with an “industry-led board of nine directors and five industry advisory standing committees”. Funding is secured from the Australian Government through the Department of Education, Employment and Workplace Relations. AgriFood Skills Australia has provided the funding for the ‘Large Animal Emergency Rescue Training’ Fellowship, which is discussed later under the “Formal Training” section.
Australian Animal Rescue

Australian Animal Rescue (AAR) was established in April 2009 after the devastating bushfires during which they spent 3 months rescuing wildlife, and getting as much food and supplies to the people and animals in the Gippsland, Kinglake and Marysville areas. They are a non-profit, volunteer organization that differs from other groups in that they specialize in domestic animal rescues as well as wildlife.

Australian Companion Animal Council

Australian Companion Animal Council Incorporated (ACAC) is a non-profit organization that promotes the benefits of socially responsible pet ownership in the Australian community. They advocate that emergency evacuation must include pets because the lives of people in disaster areas may be being unnecessarily put at risk as a result of evacuation procedures that do not include pets. They speak highly of the human-animal bond and how it impacts to disaster emergency situations.

Australian Institute of Animal Management

The Australian Institute of Animal Management Inc. (AIAM) is an “incorporated association that operates under a constitution approved by Consumer Affairs”. Their goal is to facilitate the development of “best practice in animal management” in Australia. Each year they convene a national urban animal management conference, which involves:

- “critical and constructive assessment of current urban animal management practices and performance;”
- reflection about the essential roles and purpose of urban animal management;
- motivation to step outside the square and look for better ways;
- sharing knowledge and experience and build a collegiate sense of common purpose and mutual assistance;
- consideration of occupational health and safety issues; and
- drawing together streams of consensus for national uniformity on all matters pertaining to urban animal management policy and practice.”

They advocate that animals should be included in local and state emergency plans because of the negative consequences associated with people refusing to evacuate an area in fear of leaving their pets behind.

Australian Veterinary Association

The Australian Veterinary Association (AVA) offers some advice on how to protect horses and livestock during cyclones and flooding. They have brochures that include tips such as: having an emergency kit ready and what to include in it; having your animals clearly identified before a disaster strikes; practicing your disaster plan before the wet season begins, etc. Aside from advice and brochures, they do not offer a means of rescuing these animals during such an event.
3.2.1.3. **Formal Training Available**

**Australian Veterinary Reserve Training**
AVR Members take two separate training courses. The first course trains members in field surveillance techniques during an emergency disease outbreak and includes a “one day equivalent CD Rom based program and a three day face-to-face workshop”. The second course is a “two day face-to-face workshop” that develops skills for working as “surveillance/tracing officers in Local Disease Control Centres during an outbreak”.

An “AVR Maintenance and Development Program” has been developed to help members to maintain these skills and optimize their capacity for responding to an emergency animal disease. The program aims to build a foundation between government agencies and AVR members; it involves emergency animal disease exercises and self-assessment exercises.

**Large Animal Emergency Rescue Training**
Melinda Howlett and Celia Turnbull developed the “Large Animal Emergency Rescue Training” under the AgriFood Skills International Fellowship in 2009. They investigated specialized techniques for rescuing large animals, particularly horses, from hazardous situations, such as civil emergencies and natural disasters. The driving force behind this research was “personal involvement in a number of serious, distressing and costly situations involving animals caught in hazardous situations”. The authors believe it is important to understand how to react in emergencies that involve animals, a concept that was further highlighted by the Victorian bushfires in 2009.

3.2.1.4. **Simulated Exercises**

**Australian Government**
The Australian Government’s Department of Agriculture, Fisheries, and Forestry has developed and implemented numerous training activities and simulation exercises that deal with animal disease outbreaks. To date, five major simulations include: “Exercise Hippolytus”, which dealt with disease diagnostics; “Exercise Cowcatcher”, which tested the National Livestock Identification System; “Exercise Eleusis”, which dealt with the response to a bird flu outbreak; “Exercise Minotaur”, which tested the response to a foot-and-mouth outbreak; and “Exercise Tethys”, which involved the response to an aquatic disease outbreak. These simulation exercises provide a model framework that could be applied to civil emergency and disaster simulations.

3.2.1.5. **References**

3.2.2. European Union

3.2.2.1. Legislation and Guidelines

Animal Health Strategy

The new Animal Health Strategy (AHS) was developed in 2007 by the European Commission to establish its goals regarding animal health for the next 6 years. Its intent was to harmonize the fragmented national approach to animal health and disease control by:

- prioritizing EU interventions;
- developing a modern and appropriate animal health framework;
- improving prevention strategies, surveillance methods, and crisis preparedness; and
- advocating science, innovation, and research."
The strategy categorizes animal-related threats according to their relevance, acceptable level of risk, and priority for action to reduce the risk. Currently, most of the threats they discuss are disease-related.

**EU Solidarity Fund**

Numerous grants and funds exist to respond to major natural disasters within the European Union. The goal of the EU Solidarity Fund (EUSF) is to “express European solidarity to disaster-stricken regions within Europe”. To date, 2.4 billion € have been used to support over 23 European countries affected by natural disasters. There is no mention of what the relief money is spent on, but such funds would be a great resource for animal-related rescues during natural disasters.

**Community Civil Protection Mechanism: Gap Identification**

In 2009, the European Commission released a 213-page report identifying the gaps in the capacity of the EU’s Community Civil Protection Mechanism to respond to major disasters. It is entitled “Strengthening the EU capacity to respond to disasters: Identification of the gaps in the capacity of the Community Civil Protection Mechanism to provide assistance in major disasters and options to fill the gaps – A scenario-based approach”. The report identifies numerous gaps in the emergency response capacity of the EU and has policy recommendations to rectify them. While the report recognizes the loss of animal life and consequent economic impacts this has on people, it provides no recommendations on how to mitigate the issue.

### 3.2.2.2. Organizations

#### 3.2.2.2.1. Governmental

**Community Veterinary Emergency Team**

The Community Veterinary Emergency Team (CVET) was established by the EU Commission in 2007 to deal with emergency animal health situations. The team is comprised of a group of professionals in the fields of veterinary science, wildlife, virology, laboratory testing, and risk management. The team mostly focuses on disease outbreaks.

**European Civil Protection**

The Humanitarian Aid & Civil Protection branch of the European Commission compiled a proposal for future changes on civil protection in 2005. Input from numerous stakeholders was taken into consideration, and the overall outcome was to “boost solidarity among Member States and neighbouring countries” in order to achieve the “optimal level of preparedness for emergencies and to ensure a rapid and effective response when disaster strikes”. There was no mention of making provisions for animals during emergency situations, but this is the type of organization that would be involved in such an endeavor.

**European Emergency Response Centre**

The European Emergency Response Centre (EREC) was founded in October 2010 in order to strengthen the European disaster response capacity by uniting humanitarian assistance and civil
protection services during a disaster. They wish to coordinate with the United Nations to improve communications during a disaster. The goals of the strategy are to:

- “planning and advance mapping of resources and capacities in order to ensure immediate deployment;
- pre-positioning of relief assets, through the establishment of an international logistics network maximizing the use of local resources;
- needs assessment, in the disaster relief phase and then in preparing for the rehabilitation operations;
- the efficiency and cost-effectiveness of logistics operations, through coordination units at European level;
- the coordination of transport, by using the private and military sectors and international organisations but also by increasing the options for European co-financing;
- the use of military assets, in particular by coordinating responses within the Commission.”

Currently, this strategy focuses on humanitarian aid and there are no protocols that address disaster rescue and relief for animals.

### 3.2.2.3. Formal Training

**European Civil Protection**

The European Civil Protection offers training courses to “reinforce and facilitate cooperation in civil protection assistance interventions”. In 2004, the “European Community Civil Protection Mechanism Training Programme” was developed to prepare experts for international civil protection assistance inside and outside the European Union. The program includes 12 different courses, including:

1. **Community Mechanism Induction Course (CMI)**

   “The Community Mechanism Induction Course (CMI) is a six-day introductory course and the entry point to all courses offered within the Community Mechanism training programme. The course is aimed at team leaders, deputy team leaders, managers, experts and administrators who are likely to be involved in international civil protection assistance interventions.

   The overall objective of the CMI is to introduce participants to the Community Mechanism and provide them with the basic knowledge and skills to prepare themselves for international civil protection missions, both within and outside the Community Mechanism’s geographical area.

   Particular focus is put on the scope, mandate, components and functions of the Community Mechanism but the course also covers a wide variety of other areas to familiarise participants with the international emergency environment and commonly applied working procedures.

   The course looks at the different civil protection systems within the geographical area covered by the Community Mechanism, as well as international partners and actors. European teams are likely to encounter. Topics covered include information management, use of communication and IT equipment, safety and security and cultural awareness, as well as humanitarian principles and how to organise work in an emergency situation. This is an intensive course, based on a combination of theory, group work and discussion, which requires a high degree of active participation. The course ends with a simulation exercise, where participants are divided into teams and given the opportunity to experience what it is like to work on a civil protection assistance intervention.

   Completing the introductory course is a prerequisite for attending the next course, the Operational Management Course (OPM).”

2. **Operational Management Course (OPM)**

   “The Operational Management Course (OPM) is the second course in the training programme and is open
to those who have previously followed the Community Mechanism Induction Course (CMI). The six-day course targets national experts and European Commission officials who have been selected as potential team members or liaison officers of an assessment or coordination team sent by the European Commission to facilitate assistance support and coordination in the field.

Teams of experts are often deployed to emergencies outside the EU and the course focuses on these disaster situations.

While on mission, experts are assigned by the European Commission to facilitate field coordination by assisting local authorities in close cooperation with the United Nations and other international organisations on site. The core objective of the course is not only to improve the individual capabilities of experts and teams, but also to enhance their ability to function within a wider international framework.

The focus of the course is on coordination and course topics include internationally agreed guidelines and procedures, planning, information management and how key partners work on an operational level, as well as ethics and code of conduct.

Training is carried out within the context of an emergency situation scenario, enabling participants to practice the above described topics in a realistic setting. The course ends with a one-day practical field exercise.”

3. High Level Coordination Course (HLC)

“The High Level Coordination course (HLC) is the third general course in the training programme and is aimed at experts who have been selected as managers of a team deployed by the European Commission to facilitate coordination assistance in emergencies.

HLC participants should have followed the Community Mechanism Induction (CMI) course and the Operational Management Course (OPM), before attending this course.

The course focuses on emergencies outside the Community Mechanism’s geographical area and how to work within a wider international framework. Since the course is aimed at managers, topics also focus on managerial and political aspects of civil protection assistance interventions such as mission management, negotiation, international coordination policy and media relations.

Group work, based on case studies, is an important part of the course where the participants can discuss experiences, alternatives and best practice for managing the team and the mission itself during complex situations.

The five-day course concludes with a one and a half day field exercise where participants can practice the role of Coordination Head in a realistic setting.”

4. Operational Management Refresher Course (OPMR) and High Level Coordination Refresher Course (HLCR)

“The field of emergency response is a constantly changing environment. No two emergencies are exactly the same. New actors enter the field or existing ones have their mandate changed. Changing situations and the development of new techniques and equipment mean experts need to learn about the latest developments, as well as refresh knowledge gained on earlier courses.

The training programme offers two such courses: the Operational Management Refresher Course (OPMR) and the High Level Coordination Refresher Course (HLCR). These courses are open to participants who have attended either the OPM or HLC.

Both courses are conducted over three days and are organised as seminars. The Operational Management Refresher course focuses on lessons learned from recent deployments of expert teams. The participants are divided into groups and meet with experienced trainers who take them through all the steps of a mission from pre-deployment to post-mission debriefings.

The High Level Coordination Refresher course changes topic every training cycle, which means that participants can attend one every year and always experience new content. Examples of recent topics include how terrorist attacks influence civil protection assistance interventions and the impact of climate change on natural disasters.”

5. Assessment Mission Course (AMC)

“The Assessment Mission Course (AMC) is a five-day specialised course for those who have previously followed the Community Mechanism Induction (CMI) and the Operational Management Course (OPM). The intended target group is national experts and managers in the field of coordination, European Commission officials and experts from partner organisations likely to be involved in international civil protection interventions.
The experts attending the Assessment Mission Course will be trained to carry out needs assessment in emergencies. As teams of experts can be deployed both inside and outside the European Union, the course combines training on two types of emergencies. While on mission, experts are engaged by the European Commission to carry out their tasks by assisting local authorities in close cooperation with the UN and other international organisations on site. The core objective of the course is not only to improve the individual capabilities of experts and teams, but also to enhance their ability to function within a wider international framework. The course includes sessions on how to prepare and perform a field assessment, negotiation skills and information management. The main focus of the course is a three-day field exercise where participants get to test their new skills performing needs assessments on a wide variety of location settings and meeting local officials who are experienced in managing real emergency situations.

6. Staff Management Course (SMC)

“The Staff Management Course (SMC) is one of the specialised courses open to participants who have completed the Operational Management Course (OPM). However, since this course is closely related to the Assessment Mission Course (AMC) and the Media and Security Strategy Course (MSC), it is recommended that participants who plan to attend all three courses do so in the following sequence: AMC, SMC, MSC.

The six-day Staff Management Course builds on the same scenario used during the Assessment Mission Course combining two types of emergencies unfolding in a highly complex industrialised state. While the Assessment Mission Course focuses on needs assessment, the SMC focuses on coordination and aims at improving the ability of participants to manage the set up and running of an on-site coordination structure.

The main topics of the course are team management procedures, information management, planning coordination, team psychology and mission handover and takeover procedures.

The course is conducted as a coordinated exercise, starting at the airport when participants arrive and continuing until the final day of training. Training involves theory as well as practical exercises. Self-evaluation of achievements and challenges are an important part of the course and participants are asked to do this on a daily basis.

7. Media and Security Strategy Course (MSC)

“The six-day Media and Security Strategy Course (MSC) is one of the specialised courses open to participants who have completed the Operational Management Course (OPM). However, since this course is closely linked to the Assessment Mission Course (AMC) and the Staff Management Course (SMC), it is recommended that those who plan to attend all three courses should try to do so in the following sequence: AMC, SMC, MSC.

Relations with the media and team security are essential elements of fieldwork during a civil protection assistance intervention. Disaster operations attract media attention and alongside their main task, staff of relief organisations must also meet the information needs of journalists. In addition, interventions often encompass the element of providing security advice and services to team members and partners. The core objective of the Media and Security Strategy Course is to enhance participants’ understanding, knowledge and skills in terms of media and security management at operational and strategic levels so they can act as media and security advisors within the team.

The course is made up of theory and group work sessions, where participants learn about different aspects of media and security management (international security systems, security assessments) and how to prepare press releases and press conferences. The course also includes a one-day field exercise providing participants with an opportunity to put this into practice in an emergency setting.

8. International Coordination Course (ICC)

“The six-day International Coordination Course (ICC) is one of the specialised courses of the training programme and is open to participants who have completed the Operational Management Course (OPM).

Even though all courses in the training programme contain elements of international coordination mechanisms and procedures, the growing complexity of disaster response requires experts to have in-depth knowledge of these mechanisms and procedures. This is particularly necessary in large-scale emergencies where many organisations are involved or in situations with additional challenges, such as a difficult political environment.

The overall objective of the course is to increase participants’ knowledge of, and ability to work with, other international response systems. International coordination mechanisms and the approach of other
organisations to disaster management are covered by the course, which is composed of theory, case study-based group work sessions and practical exercises.”

9. Information Management Course (IMC)

“The ability to provide accurate information in a timely manner to the appropriate stakeholders is of utmost importance during disaster response interventions in order to facilitate the delivery of assistance. Therefore, the five-day Information Management Course (IMC), focusing solely on information management, has been developed.

The IMC is the latest addition to the training programme and is open to participants who have completed the Operational Management Course (OPM).

The overarching aim of the IMC is to facilitate assessment, coordination and decision-making during expert interventions through strengthened information management processes. Specifically, the course objectives are to improve the participants’ understanding of how sound information management practices can facilitate the mission, increase and broaden their understanding and ability to apply standard information tools used in emergencies and identify best practices and share experiences in terms of information management.

The course is formed around the information management cycle and is composed of theory, group work sessions and practical exercises based on realistic disaster scenarios.”

10. Technical Experts Course (TEC)

“Experience from previous civil protection assistance interventions has shown that, as well as training assessment and coordination experts, there is also a need to train technical specialists for expert interventions. The Technical Experts Course (TEC) is a six-day course designed specifically for technical experts such as marine pollution and water management experts, environmental experts (landslides, waste management, dam stability etc), geo-hazard or logistics experts, medical staff and infrastructure engineers.

The course combines the most essential topics from the Community Mechanism Induction (CMI) and the Operational Management Course (OPM) to give participants a solid base for participating in future civil protection assistance interventions. The main objective is to introduce technical experts to the Community Mechanism and the mission cycle of operations. It also aims to increase their knowledge of international response systems and coordination mechanisms and their teamwork capability in a multi-cultural and multi-disciplinary team. Experiences from previous civil protection assistance interventions, particularly those where special expertise was required and/or used, will also be discussed. The course is composed of theory, group work sessions and a practical exercise based on disaster scenarios. After completing the TEC, participants are invited to attend other courses in the training programme on the same basis as experts who have completed the Operational Management Programme (OPM).”

11. Modules Basic Course (MBC)

“The Modules Basic Course (MBC) is a new course within the training programme. The target group is key staff from participating countries that would be deployed with their civil protection module to an emergency within or outside the European Union. Key staff can include team leaders, deputy team leaders, liaison officers or communications officers. It is recommended (but not compulsory) that participants attend the Community Mechanism Induction (CMI) course before going on to the Modules Basic Course (MBC).

The course runs for six days and includes theory, group sessions and case study work, as well as an exercise. The main purpose of the course is to increase participants’ capability to manage the civil protection modules in a multi-task and multi-stakeholder operation and to integrate them into existing national and international coordination arrangements in a disaster-affected country. The course focuses on the crucial issue of interoperability when teams are deployed alongside units from other countries.”

It is evident that the European Union has a great deal of formal training opportunities in the area of civil emergencies; however, none of the training involves the rescue of animals. Nevertheless, the current courses offer a strong foundation for the development of training programs that involve animals in the future.
3.2.2.4. Simulated Exercises

Several simulation exercises dealing with civil emergencies have been carried out in different regions of the European Union; however, they are mostly focused on the human aspect of the disaster. Some of the exercises simulate various scenarios, including: earthquakes, floods, tsunamis and terrorism-related events.

3.2.2.5. Deployments

The European Union’s Civil Protection Mechanism has been activated numerous times; however, each deployment is focused on humanitarian aid and does not involve animals.

3.2.2.6. References


EUROPA, European Commission, 2011. Summaries of EU Legislations: Strengthening the...
3.2.3. France

3.2.3.1. Overview

Fire Brigade’s “Veterinaires Sapeur Pompier”

Emergency preparedness and response is carried out at municipal, departmental, zonal, and national levels. A veterinarian is responsible for coordinating activities involving animal health and food safety during a disaster at each level. The local Fire Brigades are primarily responsible for coordinating a response during a disaster, and each brigade has a medical and health service as well as a veterinary corps (Veterinaires Sapeur Pompier, or VSP). The veterinary corps receives specific training, and its major roles include:

- “prevention and response against technological and biological risks;
- inspection and control of live animals and food-stuffs;
- veterinary support to rescue operations;
- training and follow-up of rescue dog teams;
- management of means and materials for veterinary action and management of animals;
- health and hygiene education;
- sampling and advice on dead animals;
- advice to the Command of Sapeur Pompier on environment and food chain in disasters;
- advice to the command of Sapeur Pompier on risk forecasting and prevention.”

3.2.3.2. References


3.2.4. Italy

3.2.4.1. Overview

National Department of Civil Protection

The Italian Ministry of Health published guidelines on disaster preparedness of veterinary services in 1992. The National Department of Civil Protection (Law No. 225/1992), was then established, and they later updated the guidelines in 1998. Veterinarians were involved in disaster relief response at local, regional, and national levels and the NDCP appointed a group of veterinarians to develop a national framework for protecting animal and food during a disaster.

During an emergency, veterinary services and local health agencies are activated by local civil protection authorities. According to the Italian model, the veterinary actions during non-epidemic emergencies include:

- "Natural disasters
Immediate action:
- identify any available food resources and establish whether products are still edible and safe;
- organise care and slaughter of injured animals, and identify those still fit for human consumption;
- destroy or dispose of carcasses and other waste material of animal origin;
- provide shelter and, when needed, food and water for dispersed animals;
- zoonoses control;
- pest control;
- food safety.

Successive action:
- resume normal activities of slaughtering, meat inspection, milk collection and storage;
- provide drugs, vaccines, disinfectants and pesticides;
- disinfect areas and premises at risk;
- establish epidemiologic surveillance;
- evacuate animals from the area at risk (in case of foreseeable event).

- Man-made disasters (chemical and radio-nuclear)
  - recognise the origin of the hazardous contaminant(s);
  - move or keep indoor animals from the polluted zone;
  - avoid feeding animals with contaminated roughage or pastures;
  - monitoring contaminant(s) in meat, milk and other food of animal origin;
  - toxicological surveillance over animal population.”

3.2.4.2. References


3.2.5. New Zealand

3.2.5.1. Legislation and Guidelines

Civil Defence Emergency Management (CDEM) Act

The Civil Defence Emergency Management (CDEM) Act 2002 “establishes a framework for civil defence emergency management aimed at building resilient New Zealand communities” and “seeks to improve public safety through sustainable management of hazards and coordination of emergency planning while also encouraging communities to achieve acceptable levels of risk.” The Act specifies the roles and responsibilities of civil defence emergency management organizations, government departments, lifeline utilities, and emergency services. Emergency management in New Zealand uses an “all-hazards, all-risks, multi-agency, integrated and community-focused approach.” The emergency management system coordinates different agencies and organizations for an efficient response. Risk management involves reduction, readiness, response, and recovery. The New Zealand CDEM framework includes organizations
involved in animal welfare such as the Ministry of Agriculture and Forestry and the SPCA (see Figure 3-2).

![New Zealand CDEM framework](image_url)

**Figure 3-2. New Zealand CDEM framework.**

**Animal Welfare Act**

The Ministry of Agriculture and Forestry (MAF) Biosecurity New Zealand administers New Zealand’s Animal Welfare Act 1999 ([www.legislation.govt.nz](http://www.legislation.govt.nz)). The Royal New Zealand SPCA is also able to enforce the Act. The Act requires owners and people in charge of animals ensure that the physical, health and behavioural needs of animals are met, and that pain and distress are alleviated. This requires a duty of care based on the “Five Freedoms”:

- proper and sufficient food and water
- adequate shelter
- opportunity to display normal patterns of behaviour
- handling without unnecessary pain or distress
- protection from and rapid diagnosis of injury or disease

The Animal Welfare Act requires two committees to be in place to provide the Minister of Agriculture with independent advice relating to the welfare of animals. These two committees are the National Animal Welfare Advisory Committee (NAWAC) and the National Animal Ethics Advisory Committee (NAEAC).

**Dog Control Act**

The Dog Control (Microchip Transponder) Regulations 2005 came into force on 1 July 2006. They are technical regulations made under section 78(1) of the Dog Control Act 1996.
(Department of Internal Affairs, www.dia.govt.nz). “Since 1 July 2006, all dogs registered in New Zealand for the first time (except farm dogs used for stock control) must be microchipped. This applies mainly to puppies when they are first registered at three months.” (Animal Control www.animalcontrol.org.nz)

3.2.5.2. Organizations

3.2.5.2.1. Academic

Massey University Veterinary Emergency Response Team

The Massey University Veterinary Emergency Response Team (VERT) consists of volunteer veterinarians, veterinary technologists, and veterinary nurses trained in technical rescues and in-field treatments. This includes training in urban search and rescue (USAR). The Team is based at the Institute of Veterinary, Animal and Biomedical Sciences at the Manawatu campus. They work along with the Wellington SPCA’s Animal Rescue Unit (ARU). The Massey VERT is also associated with the WSPA disaster management division and may be deployed internationally. Hayley Squance is the current director of the Massey University Veterinary Technology Programme and team leader for VERT. She has spent the past four years on a Master’s thesis in Educational & Technical Requirements for Personnel Involved in Animal Welfare Emergency Management and is also the National Animal Welfare Management (NAWEM) author of the Guide to Companion Animal Disaster Management Planning. Since their work after the Canterbury earthquakes of 2010-2011, they have received many requests to train veterinarians in Australia, America, and Asia. Massey University also has a separate Oiled Wildlife Response Unit.

3.2.5.2.2. Governmental

Ministry of Civil Defence Emergency Management

The Ministry of Civil Defence Emergency Management (MCDEM) leads a strategy to make communities resilient to hazards and disasters. The MCDEM has the country divided into 16 civil defence and emergency management regions, each with its own welfare advisory group (WAG). Each WAG includes a regional Animal Welfare Coordinator appointed by the National Animal Welfare Emergency Management Group (NAWEM) from the New Zealand Veterinary Association.

National Animal Welfare Emergency Management Group

The Guide to the National Civil Defence Emergency Management (CDEM) Plan (MCDEM 2009) includes a section on domestic animal welfare (Section 12.6.5) that states that the Ministry of Agriculture and Forestry (MAF) has a role in “leading the National Animal Welfare Emergency Management Group (NAWEM), and providing overall national co-ordination and monitoring of issues relating to domestic animals.” In other words, domestic animals are companion animals. Domestic animals are defined as “an animal that is kept by humans for companionship and enjoyment rather than for commercial reasons.” MAF encourages people to have their own contingency plans in place in case of a natural disaster or biosecurity risk.
Locally, territorial authorities are responsible for this role along with assistance from the Royal New Zealand Society for the Prevention of Cruelty to Animals (RNZSPCA) and MAF in both urban and rural environments. Local councils and emergency personnel should assist community members in planning before something happens. Livestock welfare is the responsibility of the owner. In case of an emergency, the livestock owner should have a plan to take care of the animals. The welfare of the livestock will be monitored by MAF during mass movements.

Clause 48 of the Guide (Section 12 Welfare, p9):

48 Domestic animal welfare

(1) While the Ministry of Agriculture and Forestry maintains the government’s reporting capability on adverse events and natural disasters affecting agriculture, forestry, and horticulture, and for administering any approved government programmes, it is recognised that territorial authorities provide this function locally, and that this may also extend to domesticated animals in urban environments.

(2) Local authorities may be assisted by the Royal New Zealand Society for the Prevention of Cruelty to Animals and from the Ministry of Agriculture and Forestry in both urban and rural environments.

(3) The Ministry of Agriculture and Forestry encourages farmers and vulnerable industries to develop their own contingency response plans for both natural disasters and biosecurity hazards.

The National Animal Welfare Emergency Management Group (NAWEM) is responsible for national coordination for management of animal welfare during emergencies. It consists of a group of agencies lead by MAF that provide advice on animal welfare to the National Welfare Co-ordination Group (NWCG). The other members are the MCDEM, SPCA, WSPA, Federated Farmers of New Zealand, and New Zealand Veterinary Association. The NWCG then acts to coordinate the central government’s welfare response for both people and animals.

The goals of NAWEM are to:

- raise awareness of the importance of planning for animal welfare management during adverse events,
- promote animal welfare emergency management training resources, and
- coordinate responses to animal welfare issues during adverse events.

NAWEM has been working to improve New Zealand’s preparedness for protecting the welfare of livestock and companion animals during adverse events and holds stakeholder meetings to raise awareness. They stress the importance of coordinated partnerships in response to these events while pointing out that animal welfare is an individual responsibility first.

During regional civil emergencies, the NAWEM appointed Animal Welfare Coordinator provides advice on animal welfare issues in the area to MCDEM. In a national emergency, NAWEM and the regional coordinators meet in Wellington to coordinate efforts.
National Animal Welfare Advisory Committee and National Animal Ethics Advisory Committee

MAF Biosecurity New Zealand is the division of MAF in charge of facilitating international trade, protecting the health of New Zealanders and ensuring the welfare of our environment, flora and fauna, marine life and Maori resources. The Animal Welfare Act 1999 administered by MAF requires two committees to be in place to provide MAF Biosecurity with independent advice relating to the welfare of animals. These two committees are the National Animal Welfare Advisory Committee (NAWAC) and the National Animal Ethics Advisory Committee (NAEAC).

The National Animal Welfare Advisory Committee (NAWAC) provides independent advice to the Minister of Agriculture on animal welfare, research needs, legislative proposals, codes of welfare and, and traps or devices. The committee plays an important role in the development and establishment of codes of welfare and produces various information materials including a booklet on how to write codes: Guidelines for Writing Codes of Welfare. They are currently developing a Code of Welfare for temporary housing including boarding establishments for animals (Glassey 2010). NAWAC’s full functions are listed in Section 57 of the Animal Welfare Act. The committee members appointed by MAF hold expertise in:

- veterinary science;
- agricultural science;
- animal science;
- commercial use of animals;
- care, breeding and management of companion animals;
- ethical standards and conduct in respect of animals;
- animal welfare advocacy;
- public interest in respect of animals;
- environmental and conservation management;

The National Animal Ethics Advisory Committee (NAEAC) was established under the Animal Welfare Act to provide independent advice to the Minister of Agriculture about:

- ethical and animal welfare issues relating to the use of animals in research, testing and teaching
- recommendations on the restrictions of use of non-human hominids
- advice to Animal Ethics Committees
- the development and review of codes of ethical conduct

NAEAC’s full functions are stated in Section 63 of the Animal Welfare Act.

3.2.5.2.3. Non-governmental

Royal New Zealand Society for the Prevention of Cruelty to Animals

The Royal New Zealand Society for the Prevention of Cruelty to Animals (SPCA) is a voluntary organisation dedicated to the welfare of animals. During a civil defence emergency the SPCA supports the Ministry of Agriculture and Forestry in the care of domestic animals, and where possible supports local authorities. The SPCA is a member of the National Welfare Co-ordination Group (NWCG).
Wellington Society for the Prevention of Cruelty to Animals (SPCA) Animal Rescue Unit

The Wellington Society for the Prevention of Cruelty to Animals (SPCA) Animal Rescue Unit (ARU) ([http://www.aru.org.nz/](http://www.aru.org.nz/)) is a specialized team of people trained in technical rescue of trapped animals. These animals may be under collapsed homes, in trees, or stuck on cliffs for example. It is a volunteer organisation run in conjunction with the Wellington SPCA. They specialize in high angle rescue while emphasizing welfare of the trapped animal. They are also trained in urban search and rescue (USAR). Their current chief inspector Ritchie Dawson is also trained in disaster management. They can also assist in Civil Defence emergencies if needed. The Unit is the only one of its kind in Australasia.

New Zealand Companion Animal Council

The New Zealand Companion Animal Council (NZCAC) is a national organization that represents an amalgam of various companion animal groups. This Council allows for communication and the sharing of ideas between organizations so each of them can contribute to the improvement of the companion animal welfare. NZCAC operates the New Zealand Companion Animal Register (NZCAR) of microchipped companion animals. This is a national registry that ensures that a standard type of chip and reader are used throughout the country. Dogs in New Zealand are legally required to be microchipped. The Register is maintained, promoted, and developed by a private company. All profits get distributed to various animal welfare charities. NZCAC has developed the following definition for companion animals:

“Any animal that shares a living environment and relationship with humans. The term ‘companion animal’ is an all encompassing phraseology given to an entire spectrum of animals with whom interaction and/or companionship is enjoyed by humans, and where a responsible guardianship is established and accepted for their welfare by humans. Where it is accepted that this degree of ‘companionship’ will vary by species, the expression ‘companion animal’ acknowledges the important role all such animals play in our society.”

Other

Some other non-governmental organizations involved in animal welfare in New Zealand are SAFE, Paw Justice, and Cats Protection League. SAFE is New Zealand's second largest animal advocacy organisation. Paw Justice helps deal with problems of animal abuse and neglect. The Cats Protection League is dedicated to rescuing, rehabilitating and rehoming stray and abandoned cats.

3.2.5.3. Formal Training

Animal Rescue Technician Program

The Animal Rescue Technician (ARTech) program of Mercalli Disaster Management Consulting (Mercalli 2011) was developed by chief instructor Steve Glassey. He was New Zealand's first Instructor Trainer for Rescue 3 International and is a former Ambulance Rescue Technician who has delivered specialist rescue training globally. He is the founder of the
Wellington SPCA Animal Rescue Unit and has pioneered technical animal rescue in New Zealand. The ARTech course is five days long and includes:

- Safety management
- Response legislation
- Animal emergency management planning
- Technical rescue standards
- Knots
- Equipment knowledge and maintenance
- Decontamination
- Aircraft safety
- Field euthanasia
- Chemical capture
- Anchors
- Rappelling
- Ascending
- Knot passing
- Stretcher rigging (animal harness)
- Belaying
- Lowering/hauling systems
- Tree rescue
- Ladder operations
- Veterinary triage
- And includes a number of exercises to consolidate the skills.

The VERT members at Massey are also being trained to be potential instructors in the future locally or internationally. The Rescue 3 Pacific group is on facebook at https://www.facebook.com/home.php?sk=group_200686603275576#. Steve Glassey can be reached at Mercalli Consulting at info@mercalli.co.nz.

### 3.2.5.4. Deployments

The Christchurch, NZ 6.3 earthquake hit on 22 February 2011. The RNZSPCA sent out two senior inspectors to assist the local undamaged SPCA and the NZVA sent out requests for them to determine if city apartment buildings might contain trapped pets, if welfare centres have received evacuees with pets, and to see if rescue dogs need veterinary attention. The NZVA also began to immediately compile a list of available veterinary and animal rescue personnel. No deployment was deemed necessary at this time.

On February 26, an article (Burgess 2011) reported that pet owners were breaking into the cordoned area to retrieve their companion animals. The Wellington SPCA Animal Rescue Unit and the Massey University Veterinary Emergency Response Team were deployed on February 27. The cordon area efforts were led by the local City Council’s Animal Control department with assistance of the Canterbury SPCA. The ARU and VERT rescuers searched for animals confined in damaged or cordoned off buildings and provided food and water stations to animals in this.
area inaccessible by pet owners. The 12 member group also assisted urban search and rescue teams during encounters with aggressive dogs. The teams remained on site until March 10.

WSPA remained on standby and in close contact with the Canterbury SPCA, as well as the National Animal Welfare Emergency Management Liaison Group (NAWEM), the New Zealand Veterinary Association, and Ministry of Agriculture and Forestry, who managed the animal assessment and relief work in the area. The number of animals adversely affected were considered small compared to humans. Most of the local veterinary clinics were still up and running and taking care of companion animals with minor cuts and abrasions or fractures. There were no reported injuries to horses in the area. Some roaming dogs and cats were brought to the SPCA or fostered by their finders. The process of reuniting these pets with their owners involved two websites: Pets on the Net and Trade Me. The reunification was facilitated by the large number of pets with microchip identifiers. No animal welfare issues were reported by Federated Farmers and the Ministry of Agriculture and Forestry stated that damage in rural farms areas was minimal.

3.2.5.5. References


3.2.6. United Kingdom

3.2.6.1. Legislation and Guidelines

Animal Welfare Act
The UK government updated its Animal Welfare Act in 2006. The main focus of the act is to promote welfare of and prevent harm to animals. Other topics include licensing and registration of animals, codes of practice for farm animals, and enforcement and prosecution of the act. There is no section that discusses relief for animals during disasters.

3.2.6.2. Organizations

3.2.6.2.1. Academic

University of Glasgow Institute of Biodiversity, Animal Health and Comparative Medicine
The University of Glasgow has a multidisciplinary research institute that integrates animal biology and ecology with comparative and veterinary medicine. The institute recognizes the threats posed by our current and rapidly changing environment and promotes a holistic approach to dealing with environmental change, emerging diseases, and animal and ecosystem health.

3.2.6.2.2. Governmental

Animal Health and Veterinary Laboratories Agency
The Animal Health and Veterinary Laboratories Agency (AHVLA) is a branch of the Department for Environment Food and Rural Affairs (DEFRA). Their focus is to “safeguard animal health and welfare as well as public health, protect the economy and enhance food security through research, surveillance and inspection”. They are primarily involved in the prevention and control of animal diseases in the UK, and advise policy-makers in the area of animal health and welfare using veterinary-based evidence.

Royal Army Veterinary Corps
The Royal Army Veterinary Corps (RAVC) is a branch of the British Army that provides preventative medicine, good husbandry, and training practice for service animals. In addition, veterinary officers who are deployed with the army are responsible for making decisions regarding animal deployment, disease control, zoonotic disease, and biosecurity.
3.2.6.2.3. Non-governmental

**British Veterinary Association Overseas Group**

The British Veterinary Association (BVA) Overseas Group is a division of the BVA that deals with disaster relief for animals around the world. Their aim is to create an expert panel that offers advice and expertise to governments and humanitarian agencies around the world with respect to veterinary disaster management. In addition, the group offers support to individual veterinarians involved in disaster relief.

**Royal Society for the Prevention of Cruelty to Animals**

The Royal Society for the Prevention of Cruelty to Animals (RSPCA) rescues domestic animals and wildlife, operates rehabilitation centres for animals, and works with the government and public to prevent animal cruelty. In addition, their international work involves promoting and improving animal welfare around the world as well as providing funding and volunteers for emergency responses in disaster-stricken areas.

**CFOA Animal Rescue Practitioners Forum**

In 2008, the Chief Fire Officers Association (CFOA) established the Animal Rescue Practitioner’s Forum together with the RSPCA and the British Equine Veterinary Association. The goal of this forum is to develop standard practices for animal rescue that support both firefighter safety as well as animal welfare. The key objectives of the group are:

- “raising understanding and awareness of incidents involving animal rescues;
- producing and publishing a joint protocol for equine incidents;
- developing national standards for animal rescue training; and
- identifying and establishing accreditation for animal rescue training.”

3.2.6.3. Formal Training

**Royal Society for the Prevention of Cruelty to Animals**

The RSPCA offers formal training in the area of oiled wildlife relief. The main resource used for this training program is the “Guide to Oiled Wildlife Response”, which was developed by the International Petroleum Industry Environmental Conservation Association (IPIECA) in 2004. When the RSPCA sent experts to Norway in 2009 to deal with an oil spill, they offered local wildlife veterinarians a training course that involved: how animals are affected by oil spills; methods of oiled-wildlife collection; and how to administer first aid to injured animals.

**University of Liverpool**

In October, 2009, veterinarians at the University of Liverpool launched an animal handling course for fire fighters dealing with emergency situations involving large animals, including cows, horses, sheep, and pigs. In the training session, fire fighters learn the health and safety aspects of the farm environment as well as the different methods required for handling large animals that are stabled or pastured.
3.2.6.4. Deployments

Royal Society for the Prevention of Cruelty to Animals

The RSPCA has been involved in a number of emergency responses around the world:

1. Haiti Earthquake, January 2010
   RSPCA International sent veterinary staff to Haiti to help manage the Animal Relief Coalition for Haiti, which was set up by WSPA and IFAW. The project involved setting up a mobile veterinary clinic, training Haitian veterinarians and support staff, and restoring the national vaccination program.

2. Norway Oil Spill, July 2009
   Expert staff from the RSPCA traveled to Norway in July 2009 to assist with oil-spill relief. They supervised the washing and after-care of 150 oiled birds, and offered an “oiled-wildlife response” training session to local volunteers.

   The RSPCA provided funding and volunteer staff to assist with the relief work in Myanmar in May 2008. The funding was used for emergency animal feed and veterinary supplies; it helped feed over 12,000 buffalo, treat 500 animals, and vaccinate 3700 animals.

   The RSPCA funded rescue teams to treat injured animals on farms and in rural settlements during the bushfires that ravaged parts of South Africa in 2007.

3.2.6.5. References


United States of America

3.2.7.1. Legislation and Guidelines

The Stafford Act

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) is federal law enforced since 1988. The Stafford Act is meant to ensure an orderly and systematic response to a natural disaster that requires federal assistance. The Act encourages states and regions to have their own disaster preparedness plans and insurance coverage. Declaration of an emergency under the Act triggers financial and physical assistance through Federal Emergency Management Agency (FEMA). The Pets Evacuation and Transportation Standards (PETS) Act of 2006 amended the Stafford Act to “ensure that State and local emergency preparedness operational plans address the needs of individuals with household pets and service animals following a major disaster or emergency.” FEMA mandates that emergency responses must include provisions for companion animals (Madigan and Dacre 2009). Organization and deployment of these efforts varies state to state.

APHIS administers two laws that seek to ensure the humane handling of animals: the Animal Welfare Act (AWA) and the Horse Protection Act (HPA). The AWA requires that “minimum standards of care and treatment be provided for certain animals bred for commercial sale, used in research, transported commercially, or exhibited to the public. Individuals who operate facilities in these categories must provide their animals with adequate care and treatment in the areas of housing, handling, sanitation, nutrition, water, veterinary care, and protection from extreme weather and temperatures. Although Federal requirements establish acceptable standards, they are not ideal. Regulated businesses are encouraged to exceed the specified minimum standards.” The Act does not cover pets owned by private citizens, coldblooded animals, or production animals. The aim of the HPA is to ensure that only sound and healthy horses participate in shows and to protect against inhumane practices used to increase horses’ chances of winning shows.
3.2.7.2. Organizations

3.2.7.2.1. Academic

UC Davis Veterinary Emergency Response Team

The University of California Davis School of Veterinary Medicine has a Veterinary Emergency Response Team (VERT) that is trained in large animal rescue and pet disaster preparedness. They are also trained in the Incident Command System to understand their integration into a multiagency response. They are also part of the Medical Reserve Corps of the Federal Office of the Surgeon General. They mainly operate in Yolo County, northwest of Sacramento, CA, and coordinate their efforts with the local Animal Services, OES, first responders, California VMA, and NGOs. They are trained in slinging and lifting of large animals.

UC Davis International Animal Welfare Training Institute

UC Davis also has a Veterinary Medicine International Animal Welfare Training Institute (IAWTI). Their goals are to be an impartial stage for animal welfare issues, facilitate multiagency dialogue, and train volunteers in humane treatment of animals in emergency or disaster situations. They have also initiated the California Animal Response Emergency System (CARES) to organize a structured statewide system of animal rescue response.

Louisiana State University, School of Veterinary Medicine

Louisiana State University, School of Veterinary Medicine (LSU SVM) also has a disaster response program that includes animal emergency response planning, evacuation, sheltering, emergency triage, and technical rescue skills. They have developed a functional all-hazards disaster response plan. They have received funding from the American Veterinary Medical Foundation (AVMF) to support a State/Regional Disaster Management Training Program.

3.2.7.2.2. Governmental

3.2.7.2.2.1. Federal

National Veterinary Response Team

The National Veterinary Response Team (NVRT) operates under the National Response Framework of the National Disaster Medical System (NDMS) within the Department of Health & Human Services. The NVRT can also be deployed to assist the USDA or FEMA. NVRT “provides assistance in identifying the need for veterinary services following major disasters, emergencies, public health or other events requiring Federal support and in assessing the extent of disruption to animal and public health infrastructures (Department of Health & Human Services 2011).”

Hierarchy of NVRT:

U.S. Department of Health & Human Services
  Office of the Assistant Secretary for Preparedness and Response
    Office of Preparedness and Emergency Operations (OPEO)
      National Disaster Medical System (NDMS)
        National Veterinary Response Teams (NVRT)
The NVRT personnel are private citizens such as veterinarians, animal health technicians, and epidemiologists who become temporary employees of the federal government in the event of a disaster. During a disaster, they must work under the Incident Command System (ICS) to provide assessments, technical assistance, public health and veterinary services under the guidance of state and/or local authorities (Figure 3-3).

![Diagram of Incident Command System (ICS)](source)

**Figure 3-3. Federal Emergency Management Agency (FEMA) Incident Command System (ICS).**

The Department of Homeland Security has a National Response Framework to follow if federal assistance is needed by a state. The Framework has 15 Emergency Support Functions (ESF). The ESFs that deal with animal welfare are ESF 6, 8, 9, 11, and 14. These require that states and counties develop and implement disaster preparedness plans in order to expect federal funding for disaster response. The ESFs are coordinated by FEMA. The following lists the ESFs related to animals:

- **ESF #6** – Mass Care, Emergency Assistance, Housing, and Human Services  
  Coordinator: DHS (FEMA)
- **ESF #8** – Public Health and Medical Services  
  Coordinator: Department of Health & Human Services
- **ESF #9** – Search and Rescue  
  Coordinator: DHS (FEMA)
- **ESF #11** – Agriculture and Natural Resources  
  Coordinator: Department of Agriculture
- **ESF #14** – Long-Term Community Recovery  
  Coordinator: DHS (FEMA)
National Animal Health Emergency Response Corps

The US has a veterinary corps called the National Animal Health Emergency Response Corps (NAHERC). This corps is part of the United Stated Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS). The Corps has a pre-approved list of trained animal health professionals available to serve if and when needed (Figure 3-4). The list includes veterinarians, technicians, and students. Recruitment occurs through the USAJOBS website. The Corps was established in 2001 to deal with foreign animal disease (FAD) outbreaks as well as other disasters involving livestock, poultry, companion animals, or wildlife. During deployment, members become temporary employees of USDA-APHIS and are compensated for their work hours and expenses at Federal Government General Schedule (GS) rates. This group’s main focus appears to be on FADs rather than civil emergencies.

The Department of Defense also has the US Army Veterinary Corps that can assist in federally declared disasters if requested by a state governor.

![Figure 3-4. NAHERC membership as of December 2010 (NAHERC).](image)

3.2.7.2.2. State Animal Response Team

About 26 states have or are developing a State Animal Response Team (SART). The first SART was formed in North Carolina after the 1999 Hurricane Floyd. The public private partnership SART are interagency state organizations dedicated to preparing, planning, responding and recovering during animal emergencies (Wingfield 2009). During disasters, the team unites government agencies and private sectors around the common goal of animal
issues. SART members are trained to facilitate a safe, environmentally sound and efficient response to animal emergencies on the local, county, state and federal level. The teams work under the Incident Command System (ICS) in cooperation with state and local emergency management personnel and protocols. Some SARTS operate through a charitable organization rather than the state government for funding purposes (NCSART 2011). The following paragraphs describe some of these existing teams.

The Louisiana State Animal Response Team (LSART) developed from the Louisiana Veterinary Medical Association (LVMA) Disaster Committee. After Hurricane Katrina, LSART became a division of the non-profit Dr. Walter J. Ernst Veterinary Memorial Foundation (WJE). LSART is an organization of groups and individuals with an interest in animal well-being related to emergencies or disasters. Membership consists of veterinarians, animal control officers, humane organizations, and citizen volunteers. The responsibilities of LSART are to:

- make resources available to parishes for emergency planning, response and recovery.
- assist local jurisdictions in planning and preparing for all types of emergencies involving all animals.
- register teams of volunteers in companion animal, equine and food animal sections.
- provide training in NIMS, ICS, evacuation protocols, shelter management and other aspects of emergency planning.
- provide community public information and messaging for emergency preparedness.
- respond to emergencies by assisting with evacuation, sheltering, and search and rescue.

In Mississippi, the Mississippi Animal Response Team (MART) is the official coordination and response team for disasters involving animals and agriculture. It is part of the Mississippi Board of Animal Health. MART volunteers include emergency managers, producers, veterinarians, animal health professionals, animal control officials, conservationists, law enforcement officers, public health workers, and even general public. They are trained to support county, regional, and state emergency and incident management groups.

The group in California is called the California Animal Response Emergency System (CARES) and is within the Department of Food and Agriculture. CARES is responsible for coordinating resources and decisions in state-level emergencies or incidents. They have developed evacuation, safety and relocation procedures for livestock and pets. They, along with personnel from fire, animal control, law enforcement, and animal rescue groups, reviewed and revised a document drafted by the California Emergency Management Agency to include animals. This CARES document is designed to provide a standardized framework for complex emergency response operations (CARES 2010).

The Colorado Veterinary Medical Foundation, Animal Emergency Management Program does not coordinate animal evacuation and sheltering during a disaster. That responsibility belongs to the local jurisdiction in charge of the incident. Animal evacuation and sheltering services are typically provided by trained volunteers and professionals. The CVMF-AEMP supports Community Animal Response Team (CART) development by providing technical assistance, resource development and training. The CVMF-AEMP also coordinates the Colorado Veterinary Medical Reserve Corps (CO VMRC), which is under the Colorado Medical Reserve Corps program. The CVMF website has training modules (Figure 3-5) and Standard Operating
Procedures on Evacuation, Search and Rescue, Sheltering and Veterinary Services (CVMF 2011). The CO VMRC may be deployed by:

- local emergency management to provide veterinary and animal emergency response support during emergency situations.
- the State Veterinarian during an animal health emergency or other state-level incident where veterinary and animal response personnel are needed.
- the Unit Coordinator to support a planned event where service animals are utilized and are in need of care.

Figure 3-5. Colorado Veterinary Medical Reserve Corps training modules from http://cvmf.org/displaycommon.cfm?an=1&subarticlenbr=61.

Veterinary Medical Reserve Corps

Many other states also have a Veterinary Medical Reserve Corps (VMRC) program. The VMRC might be part of the human Medical Reserve Corps (eg. The California Veterinary Medical Reserve Corps) or associated with the chief animal health official of the state. The Medical Reserve Corps is a national program of the Office of the Surgeon General and Citizen Corps. The function and specific name for each VMRC state to state varies. Some respond to animal diseases while others are capable of all-hazards emergency response. Members of the VMRCs are trained veterinary professionals from the private sector that can be called upon to assist in a state emergency (Dennison, State, 2009). Members of state VMRCs can also sign up for the USDA NAHERC program to assist in national level emergencies.

For example, the California Veterinary Medical Reserve Corps (CA VMRC) is coordinated by the Disaster Preparedness Committee of the California Veterinary Medical Association (CVMA). It is also a Unit of the Medical Reserve Corps (MRC). The mission of The CA VMRC is to preserve animal well-being and protect the public health and welfare by providing emergency veterinary medical care and expertise in all phases of disaster preparedness and response.

The North Carolina Veterinary Response Corps is within the North Carolina Department of Agriculture & Consumer Services. It is a federally funded program that trains veterinarians and veterinary technicians to improve preparedness and response to disaster events that affect livestock and companion animals. North Carolina has a large numbers of livestock but currently
has few veterinarians trained in disaster response affecting them. The goal of the Corps is to develop a surge capacity of professionals that can respond to all-hazard disaster events.

As of May 2008 (Wingfield 2009), the states with both SART & VMRC were Washington, Colorado, Kansas, Michigan, Indiana, Ohio, New York, Maryland, Tennessee, North Carolina, Alabama, and Florida. Nevada, Alaska, and Hawaii had neither. The states with VMRC only were Oregon, Idaho, Montana, Wyoming, North Dakota, South Dakota, Iowa, Missouri, Illinois, Wisconsin, Oklahoma, Arizona, and New Mexico. The rest of the states had only SART.

**National Alliance of State Animal and Agricultural Emergency Programs**

The National Alliance of State Animal and Agricultural Emergency Programs (NASAAEP) is a new charitable organization that allows state veterinary teams to collaborate and network with each other. Membership includes SARTS, VRMCs and other similar programs. This program focuses on nongovernmental partnerships, private sector contributions, local planning, and further development of state and regional all-hazards, all-species emergency management capabilities (Wingfield 2009).

### 3.2.7.2.3. Non-governmental

**AVMA’s Veterinary Medical Assistance Team**

The American Veterinary Medical Association (AVMA) is a non-profit association that represents veterinarians working in private and corporate practice, government, industry, academia, and uniformed services. The mission of the AVMA is “to improve animal and human health and advance the veterinary medical profession.”

The Veterinary Medical Assistance Team (VMAT) was created by AVMA in 1992 after Hurricane Andrew. Initially, the organization was established as a public-private partnership with the Federal Department of Health and Human Services (HHS) to aid the government in veterinary emergency preparedness and response. In February 2008, the AVMA signed a new memorandum of understanding with HHS to make VMAT solely AVMA operated while the government developed its own NVRT program. VMAT works closely with both NVRT and the state VMRCs. VMATs will be deployed when requested by the appropriate state animal health authority. The three main functions of VMAT are:

1. Early assessment of veterinary conditions and infrastructure
2. Basic primary field treatments
3. Training to state associations, professionals, and colleges

AVMA has produced a 402 page Emergency Preparedness and Response Guide (AVMA 2010). This guide includes recommendations on how animal care givers can prepare for disasters well in advance to ensure that animals will be taken care of. It also contains information on animal handling and care as well as human euthanasia when necessary.

**United Animal Nations**

The United Animal Nations (UAN) was founded in 1987 in California to focus on “bringing animals out of crisis and strengthening the bond between people and animals through a variety of programs, including emergency sheltering, disaster relief services, financial assistance and
education.” UAN volunteers are specially trained to take care of and shelter large numbers of animals. They work for free and travel at their own expense to disaster situations when requested by the American SPCA or other authorities. During their work, they are distinguishable by their red shirts. As of June 2011, the organization is now called RedRover.

Red Cross and FEMA

The Red Cross and FEMA have memoranda of understanding with various animal welfare organizations to designate them as official animal responders following disasters (Irvine 2006). These include national and international organizations such as the Humane Society of the United States, Humane Society International, the American Humane Association, Code 3 Associates, Noah’s Wish, and Emergency Animal Rescue Services. Requests for them usually come from an affected state. These organizations do not have an official role within the Federal Response Plan.

American Society for the Prevention of Cruelty to Animals

The American Society for the Prevention of Cruelty to Animals (ASPCA) “works to rescue animals from abuse, pass humane laws and share resources with shelters nationwide.” They are also involved in disaster preparedness and response when needed. They are currently hiring a Disaster Response Director based out of New York, NY. This person would be responsible for developing and maintaining internal and national disaster readiness programs. He/she would also assist with field operations, prepare reports and debriefs, and develop partnerships. Disaster preparedness guidelines to the public include:

- Not leaving pets behind
- Keeping an emergency kit handy
- Making arrangements for temporary caregivers
- Identifying pets and carriers with tags and microchips

Humane Society of the United States

The Humane Society of the United States (HSUS) has a trained Animal Rescue Team that rescues animals from disasters as well as puppy mills, dog-fighting and other cruelty situations. They have also produced brochures on disaster preparedness for pets, horses, and livestock. However, they are not veterinarians.

3.2.7.3. Formal Training

Independent Study Program

The US Department of Homeland Security, Emergency Management Institute (EMI), Federal Emergency Management Agency (FEMA) has an online Independent Study Program (ISP) (http://training.fema.gov/IS/crslist.asp). These courses can be taken for free by any US citizen and can be taken for college credit by US veterinary students. Each year a limited number of international participants are allowed to take the courses for credit through sponsorship by the International Association of Emergency Managers. Non-US residents can access, download and use the course materials on the website, but printed materials, final exams and certificates are provided to US residents only. There are 6 courses, each taking 3 to 4
hours to complete, that are relevant to veterinary professionals participating in disaster response. These are listed below along with course descriptions from the website:

**IS-100.b (ICS-100) - Introduction to Incident Command System**
Introduces the Incident Command System (ICS) and provides the foundation for higher level ICS training. This course describes the history, features and principles, and organizational structure of the Incident Command System. It also explains the relationship between ICS and the National Incident Management System (NIMS).

**IS-200.b (ICS-200) - ICS for Single Resources and Initial Action Incidents**
Designed to enable personnel to operate efficiently during an incident or event within the Incident Command System (ICS). ICS-200 provides training on and resources for personnel who are likely to assume a supervisory position within the ICS. Developed collaboratively with National Wildlife Coordinating Group (NWCG).

**IS-700.a - National Incident Management System (NIMS) An Introduction**
This course introduces and overviews the National Incident Management System (NIMS). NIMS provides a consistent nationwide template to enable all government, private-sector, and nongovernmental organizations to work together during domestic incidents.

**IS-10.a - Animals in Disaster: Awareness and Preparedness**
This course is intended to help animal owners, care providers, and industries to understand incident management. The objectives of this course are to increase awareness and preparedness among animal owners and care providers, and to describe how typical hazards affect animals and what can be done by responsible owners to reduce the impact of disasters.

**IS-11.a - Animals in Disaster: Community Planning**
This course provides information for groups to meet and develop meaningful and effective plans that improve the care of animals, their owners, and the animal-care industries in disasters. The objectives of this course are to learn how to develop a community plan for managing animals in an emergency, identify hazards and threats most likely to affect your community and ways to minimize their impact on animals, indicate how communities use the Incident Command System (ICS) to respond effectively to an incident involving animals, describe resources available to help communities recover from a disaster, and develop community support for a disaster preparedness plan involving animals.

**IS-111 - Livestock in Disasters**
This Independent Study course is for farmers, extension agents, emergency managers and others who have interests in the livestock industry. It describes the various hazards that animals can face and how to mitigate them, as well as how to respond to an actual disaster. The livestock industry is a multi-billion dollar business that provides food for the American people as well as those overseas. It is important to insure our livestock are safe from hazards and will not suffer from the effects of hazards. This course can be downloaded from the Independent Study Web site and the test can be completed and submitted online.

The NAHERC training website ([https://naherc.sws.iastate.edu/](https://naherc.sws.iastate.edu/)) is maintained by The Center for Food Security and Public Health located at Iowa State University College of
Veterinary Medicine. The courses listed include the FEMA courses ICS100, 200 and 700 along with courses on vesicular and exotic avian diseases.

Membership in the state VMRCs also require specific training by participants that may include completion of some of the above FEMA online courses. For example, to join the Colorado VMRC, individuals should first complete the IS 100a (Incident Command System) and IS 700a (National Incident Management System) course before submitting an application. Applicants are then enrolled in the Colorado VMRC Introductory Training Program webinar. The webinar consists of four basic training modules that take about 1.5 hours each to complete:
1. Introduction to Animal Emergency Management for Veterinary Professionals
2. Bio-Defense and Zoonoses
3. Overview of CBRNE (Chemical, Biological, Radiological, Nuclear and Explosive) Threats
4. Personal Preparedness and Business Contingency Planning

International Animal Training Institute

The International Animal Training Institute (IAWTI) at UC Davis Veterinary Medicine aims to be a voice for animal welfare by bringing together veterinarians, animal scientists, and other stakeholders. Their goals are to:
- provide a neutral platform for all animal welfare issues to be scientifically explored,
- facilitate multi-agency discussions,
- train veterinary students and others in the humane treatment of animals in disaster situations,
- coordinate existing expertise and resources, and
- establish a globally recognized animal welfare program with humane, solution based education and new scientific studies.

Apparently, some veterinary schools (could not determine which ones) in the US already now require students to complete an emergency management certification course prior to graduation or offer elective courses. A course on Veterinary Disaster Emergency Management was offered as an elective course at Saint George’s University, Caribbean Veterinary School in March 2011. Course content consisted of:
- Natural and manmade disasters requiring veterinary planning and response
- Animal related issues in disasters such as:
  - Pets; livestock; food and waterborne diseases; euthanasia of animals; carcass disposal
- Veterinarians’ role in preparation and response
- Liability and legal issues
- Crisis and risk assessment, communication, education of animal owners and public
- Mental and psychological health issues for responders
- Local, state, federal, global organizations involved in disaster planning and response
- Scenarios involving animal issues in disasters: student small group exercises

The Instructor was Dr. Kathleen Connell, DVM who is a Certified Master Trainer for Agroterrorism and Animal Disease Response Training and also a former Washington State veterinarian. She was responsible for implementing emergency management plans in response to the first Bovine Spongiform Encephalopathy case identified in the US, the threat posed to Washington State by Highly Pathogenic Avian Influenza in British Columbia, and Spring Viremia
of Carp (SVC) identified in the US. She also spent one year as a Congressional Science Health Policy Fellow (AVMA funded) to the US Senate.

Purdue University

Purdue University in Indiana has a Graduate Certificate Program in Veterinary Homeland Security. The courses are offered through distance learning by the School of Veterinary Medicine, National Biosecurity Resource Center for Animal Health Emergencies. Current courses offered are:

- VCS 640 Introduction to Veterinary Homeland Security
- VCS 642 High Consequence Disease Review: Bovine
- VCS 643 High Consequence Disease Review: Equine
- VCS 644 High Consequence Disease Review: Swine
- VCS 645 High Consequence Disease Review: Minor Species
- VCS 646 High Consequence Disease Review: Avian
- VCS 647 High Consequence Disease Review: Zoonotic
- VCS 648 Defining the Threat
- VCS 649 Understanding the Response
- VCS 651 Biosecurity for veterinary responders
- VCS 652 Euthanasia and Carcass Disposal
- VCS 653 Veterinarian's Role in Community Planning
- VCS 654 Foodborne Illness
- VCS 655 GIS Applications in Veterinary Emergency Management
- VCS 657 Crime Scene Management
- VCS 659 Business Continuity Management

3.2.7.4. Deployments

NAHERC

Over the years, veterinary professionals enrolled in the NAHERC have assisted with the 2001 foot-and-mouth disease outbreak in the United Kingdom, the 2002 low pathogenic avian influenza task force in Virginia, and the 2003 Exotic Newcastle Disease task force in California. More than 300 NAHERC members have responded to requests for assistance.

Joplin, Missouri Tornado, May 2011

A category EF-5 tornado (>322 km/h winds), the highest on the scale, hit Joplin, Missouri at 5:41pm on May 22, 2011. Some local clinics were still standing but they were without power and not suitable for housing and taking care of injured pets (Fiala 2011). Soon after the storm hit, the Missouri State Emergency Management Agency requested a disaster response team from The Humane Society of Missouri (HSMO). Fifteen members, including one veterinarian and professionals trained in emergency animal rescue and shelter operations, were deployed on May 23 with their Big Animal Rescue Truck (BART) to rescue animals and operate an emergency shelter. The ASPCA also was involved in the rescue efforts (Humane Society of Missouri 2011). An animal shelter was set up at Missouri Southern State University (MSSU) by the Humane Society and Joplin Animal Control. Persons being housed at the shelter at MSSU
were able to place their pets at this animal shelter. They also had a separate emergency shelter at a warehouse with the capacity to care for several hundred pets of persons who are not being sheltered at MSSU. About 600 pets were found after the tornado as of the end of May and about 200 of these had been returned to their owners. On May 24, the HSMO was authorized to begin animal rescue activities in the devastated areas. They also investigated reports of dogs interrupting human rescue efforts. Six more trained emergency response volunteers and two HSMO shelter staff arrived in Joplin to increase the team to 23 people. The Humane Society of Missouri Disaster Response Team and ASPCA wrapped up their rescue and sheltering work in Joplin on June 7.

Missouri Voluntary Veterinary Corps and its team of veterinarians and technicians were on standby, awaiting orders from FEMA to deploy if necessary. Veterinarians volunteering for them had to have a license to practice in the state. The corps did not want to inundate the area with resources without knowing what was needed. Local veterinarians who were members joined in the efforts at the Humane Society and also set up triage stations where they could. Some common medical issues seen by the veterinarians were paw injuries, lacerations, and contamination by things like organic phosphates, tars, oils and chemicals. Some search and rescue dogs were exposed to inhalation damage by insulation in collapsed buildings. One of these developed pneumonia and laryngeal paralysis.

3.2.7.5. References


3.3. Standards in Developing Countries

3.3.1. Overview

We were unable to find any substantial information regarding veterinary disaster medicine in developing countries. However, various articles indicate that the developed world recognizes the need for integration between veterinarians and para-professionals in the public and private sectors in developing countries. The driving force behind the idea of integration is the reduced availability of veterinary services for livestock owners due to recent economic restraints that have led to the privatization of veterinary services. Currently, the focus of developing countries is not to implement provisions for animals during disaster situations, but rather to procure day-to-day veterinary care for producers.

3.3.2. References

3.4. Recommendations for Veterinary Reservist Training

3.4.1. Recommendations

FEMA Training
The four phases of Emergency Management are mitigation, preparedness, response, and recovery. Here is a short description of each:

- **Mitigation** – prevent or reduce the cause, impact, and consequences
  *e.g.* Construction of flooding barriers, anchoring buildings, reinforcement, insurance
- **Preparedness** – planning, training, and education
  *e.g.* Plans of what, where, who; drills and exercises; supply list; identify vulnerabilities
- **Response** – immediate
  *e.g.* Implementation of plans, SAR, protection; address food safety to public
- **Recovery** – restoration
  *e.g.* Minimize stress-related illnesses, rebuild to higher standards

All disasters are initially local and declared by a mayor, city manager, or commissioner for example. Then state/provincial assistance may be requested if needed. A major disaster would warrant request of federal assistance, including personnel and finances. A major disaster is large-scale, broad geography, and beyond scale of local community response. Issues that may come up during a major disaster include:

- Temporary accommodation
- Testing, transport, and certification of animals to be slaughtered
- Notices of evacuation
- Isolation of area
- Disaster intelligence (potential impact)
- Disease control interventions
- Evacuation failures of owners
- Animal rescue attempts
- Carcass disposal
People involved in disaster response, including veterinarians, should be familiar with the incident command system (ICS). The ICS enables efficient coordination of groups involved in disaster response efforts. Persons should be familiar with:
- Applications
- Organizational principles and elements
- Positions and responsibilities
- Facilities and functions
- Planning

ICS is a standardized, on-scene, all-hazards incident management concept that enables coordination, common processes, and integration. The ICS is a model for organizing the chain of command. This chain has five groups of response personnel: Command, Planning, Operations, Logistics, and Finance. When it comes to veterinarians involved, the planning division might include animal welfare or epidemiology. Logistics may provide resources, services and support, such as medical supplies, to execute a plan. The operations section develops and conducts the tactics to execute the plan, such as vaccinations for example. Finance involves administration and accounting services. Each section has its own chief who reports to the incident commander, as seen in Figure 3-6.

![Figure 3-6. Framework of the Incident Command System (FEMA).](image)

In the United States, the ICS is the functional field organization and management unit of the National Incident Management System (NIMS). The NIMS is part of the National Response Plan (NRP) dictated by Homeland Security. The NRP makes federal assistance available when state and local response efforts are overwhelmed. Figure 3-7 shows how the NIMS and ICS fit together.
An important aspect of disaster preparedness is the cataloguing of resources, including equipment and personnel (Wenzel 2007). A very specific list of available and needed resources should be prepared in advance for different disaster scenarios to allow for efficient response. There shouldn’t be any misunderstandings when a piece of equipment is requested by personnel. Communications need to be specific and clear. Language used should also not include abbreviations or acronyms to avoid confusion.

There are many consequences of disasters. Below is a list of eleven categories identified by FEMA that should be addressed during and after a major disaster.

1. **Communication Challenges**
   Poor communication causes confusion during a disaster. Messages communicated need to be clear and unambiguous. Confirmation of sending, receiving and acknowledging of messages is important. The sources of information should be authenticated. Land line and cell phone communication can become overwhelmed and unavailable during a disaster.

2. **Infrastructure Failure**
   Power failure affects lighting, cooling, heating, and watering and milking equipment. Other failures include shelters, roads, fences and buildings.

3. **Public Health and Animal Safety**
   Planning ahead and reacting promptly to warnings reduces chances of putting yourself, rescue personnel and your animals in danger. Post-disaster, livestock that survive might not be suitable for human consumption. Care should be taken in considering if feed has been contaminated.

4. **Evacuation**
   Livestock require time to evacuate. Arrangements should be made ahead of time to borrow trailers if necessary in the event that something happens. Animals should be
clearly identified with tags, tattoos, leg bands, microchips, brands, hair clipping, or paint. It is highly recommended that only experienced livestock handlers be used to move or work with horses and livestock.

Depending on the disease status of the herd and where animals are being moved (e.g., across state lines), moving farm animals requires veterinary certification. Preparing health certificates takes time and should be initiated as soon as a hurricane watch is issued, if it hasn’t already been done.

5. **Animal Escapes**

Escaped animals tend to scatter and can be hard to find and catch. This often requires assistance from people knowledgeable of their normal behaviour. The safety of the rescuers remains most important. Owners of escaped animals may become responsible for damages caused by the animals during the incident.

6. **Hazardous Materials**

Chemicals that could be released from farms include pesticides, fertilizer, petroleum products, solvents, detergents, and veterinary drugs. These can contaminate human and animal water or food supply. Proper training and certification are required to deal with such releases.

7. **Farm Waste Spills**

Floods can damage manure handling facilities and lagoon systems. The runoff can impact the natural environments and wildlife. This can cause fish die-offs and pollute waterways. Human waste treatment facilities in low-lying areas could also be affected by flood waters.

8. **Carcass Disposal**

An example of a situation where large numbers of animals may have to be disposed of is contamination of food animals by chemicals accidentally introduced into their feed. Such contamination before processing is referred to as intoxication. A veterinarian should be contacted as soon as unusual illness is seen to determine the cause. Biosecurity to reduce such incidents involves secure feed storage and quality assurance testing. Carcass disposal needs to be effective and efficient and take into account environmental and health concerns. Preparedness planning will reduce costs and ensure appropriate methods are used. Special permits may be necessary in some situations.

9. **Euthanasia**

During disasters, animals may need to be humanely killed. The largest numbers likely being during a Foreign Animal Disease outbreak. Veterinarians will have to prioritize which animals to save. Decisions to euthanize should be made with the owner’s consent if possible. Euthanasia of exotic/zoo animals may require special training and personnel with dartgun certification.

General recommendations that should be followed include:

- Make every attempt to contact the owner and/or insurance company, and, if possible, document these attempts and any conversations. The comments/suggestions of the owner should be in writing. If verbal instructions for euthanasia are the only confirmation available, ensure a third person witnesses the instructions.
- Render only treatment that is necessary to prevent suffering or worsening of the medical condition.
- Continue treatment until arrangements can be made for removal and future care of the animal.
- Gather and maintain records of services provided and pertinent information from witnesses at the scene.
- Use good judgment and restraint in discussing the nature of the accident, the condition of the animals, and what is done to them with anyone

10. Animal Welfare
The AVMA defines animal welfare as “a human responsibility that encompasses all aspects of animal welfare, including proper housing, management, nutrition, disease prevention and treatment, responsible care, humane handling, and when necessary, humane euthanasia.” Animals under human care should have access to feed, water, bedding, be protected from the elements, and be able to express normal behaviour. Caring for animals during a disaster may facilitate the personal safety and welfare of people. Mitigation of threats to animal welfare in disasters involves having defined standards and decision-making criteria ahead of time.

11. Public Concern
The public are concerned about the food supply, animal welfare, and the environment. Misperceptions and actual risks associated with food safety need to be addressed immediately. The public should also be informed about animal welfare strategies taking place. There should be no delays in conveying messages to the public to avoid rumors and negative perceptions about the effectiveness of the disaster response. Scientific information needs to be shared in a way that is understandable by the general public. All official press releases should go through the Incident Command System. A Public Information Officer (PIO) should be designated to ensure that officials, media, and others receive current and appropriate information.

Veterinarians who wish to assist in major disaster response should first be fully trained in protocols and procedures (Nusbaum et al. 2007). They should then only deploy if requested to do so by the appropriate authorities. Veterinarians participating in the Reserve should take several things into consideration before deciding if they will be able to assist in an emergency response. A veterinarian needs to have sufficient arrangements made with their practice and their family to deploy with short notice. A vet should consider whether or not they have the appropriate skills and confidence to participate in a given situation. It is a veterinarian’s responsibility to keep their skills and knowledge up to date. They should be prepared to bring along three to five days worth of self-support supplies. All emergency responders should be fully credentialed with photographic identification (Wenzel 2007). Unexpected volunteers cannot be used efficiently and may become a burden to incident management.

Other Resources
The Veterinary Disaster Response guide (Wingfield 2009) is a wealth of information for veterinary reservists. Here is a list of things in the guide that should be taught to reservists:
- Incident Command System
• Leadership
• Communications
• Navigation skills (maps, GPS etc)
• Record keeping
• Animal identification (tags, markings etc)
• Risk assessment
• Dealing with media
• Biosecurity
• Triage
• Zoonoses
• Public health
• Hazardous materials
• Personal Protective Equipment
• Decontamination
• Transporting animals
• Domestic animal handling
• Wildlife handling
• Animal sheltering
• Disinfection of facilities
• Pain management
• Humane euthanasia
• Carcass disposal
• Awareness of psychological repercussions
• Planning for disasters in the private practice and community

CVR Training Suggestions

Canadian Veterinary Reservists can learn from the information in the above FEMA training modules. Although some of the information is specific to the United States system, Canadians should still be familiar with Incident Command Systems to allow for an organized and efficient disaster response. Reservists should become familiar with the types of events that could happen in their own and nearby communities. They should know how to plan ahead for themselves in their clinics and homes. They should also be willing to pass along valuable information to their clients on how to be prepared. Reservists need to be fully aware of what they might face once on scene of a disaster. They should only sign up if they will be able to face difficult situations and decisions such as euthanasia.

Veterinary students can be trained to be reserve ready before they graduate. The best way to offer this training is probably through fourth year rotations. The rotation could consist of one week of foreign animal disease training and one week of civil emergency training. Another option is to offer a weekend workshop that students from any year could participate in, although two days would not be long enough to be comprehensive. This type of workshop has been offered in oiled bird rehabilitation. Some students between second and third year might be willing to take a one week course during the summer off.
3.4.2. References


4. CANADIAN VETERINARY RESERVE
SCENARIOS OF INTEREST

4.1. All Hazards

4.1.1. Medical Procedures and Supplies

Veterinarians play an increasingly crucial role in helping animals in times of disaster. All veterinary clinics should have a plan in place for themselves to relocate animals, have backup records, and supplies to operate for up to two weeks. They should have emergency plans, fire prevention protocols, and insurance. If clinics near a disaster area are still operational, they can be used as staging areas and temporary shelters for small numbers of animals.

For disaster preparation involving animals, there should be an established national veterinary stockpile of drugs available for rapid deployment. Other supplies that should be on hand include collapsible cages, plastic kennels, fluids, deworming medications, vaccines, exam gloves, wound care, antibiotics, surgical packs, and pet foods. Major things that need to be considered during a disaster are:

- Transportation
- Decontamination
- Triage, including in the field care and stabilization
- Disease management – evaluate for disease, notify others, biosecurity and sanitation
- Separate areas for different species
- Documentation – animals, supply use, medications
- Communications – debriefings

Some medical situations that veterinarians may encounter during a disaster include emergencies such as shock, neurological conditions, hypoglycemia, heat stroke/hyperthermia, or hypothermia/frostbite. They will also see common injuries such as skin/pad lacerations, punctures, fractures, torn nails, and eye injuries. Basic supplies needed for these include antiseptics, bandaging materials, cotton swabs, syringes, needles, antibiotics, NSAIDs, and chemical restraint. Animals housed at temporary shelters may present with stress-related or aggressive behaviours, bite wounds, infectious diseases (eg. respiratory), parasites, fleas, skin or eye problems, and gastrointestinal diseases. Since it cannot be predicted how much resources will be needed, back-up sources should be identified for ready access to extra equipment, supplies and medications.

Veterinary triage involves sorting patients for treatment priority and providing the greatest good to the greatest number. During triage, animals may be tagged with the following colours determined by evaluation of Respirations/min, Pulse rate/minute, Pulse pressure, and Neurological status (RPPN). Animals can be labelled with triage tags indicating medications given and locations of wounds etc.

- Red – needs immediate attention (abnormal RPP)
- Yellow – urgent but can wait a bit (abnormal PPN)
- Green – minor injury (normal RPPPN)
- Black – unsalvageable, dying (mortally wounded, severely abnormal)
Field triage may involve only Red, Green and Black designation without examination of respirations etc of individual animals. A specific list of supplies suggested by the AVMA and CDC for disaster relief is as follows (where □ identifies frequently needed essentials and o identifies less used items):

### ANTIBIOTICS
- □ Clavamox or Amoxicillin – pill and inj (lots)
- □ Doxycycline – pill and inj (lots)
- □ Flagyl – pill and inj (lots)
- □ Baytril – pill and inj (lots)
- □ Azithromycin (lots)
- o Antirobe – pill and inj
- o Tribrissen
- o Gentocin
- o Cephalexin – pill and inj
- o Tetracycline

### CARDIAC / RESPIRATORY DRUGS
- □ Lasix – oral and inj (lots)
- □ Lidocaine
- □ Atropine
- □ Epinephrine
- o Torbutrol – pill and inj
- o Terbutaline – pill and inj
- o Aminophylline – pill
- o Spironolactone (1)
- o Nitroglycerin Ointment
- o Enalapril
- o Digoxin 0.125mg
- o Diltiazem
- o Amlodipine
- o Baby Aspirin
- o Dobutamine
- o Doxapram

### STEROIDS
- □ Prednisone – oral and inj (lots)
- □ Solu Delta Cortef
- □ Dexamethasone
- o Prednisone – oral and inj
- o Depomedrol

### NSAIDS / PAIN
- □ Metacam
- □ Rimadyl
- □ Etogesic
- o Dermaxx
- o Ascriptin
- o Cosequin
- o Aspirin

### SEDATIVES (LOCK BOX)
- □ Acepromazine – oral and inj
- □ Ketamine
- □ Valium
- o Dormitor
- o Antisedan

### MISC MEDS
- □ Heparin inj
- □ Euthanasia solution (LOCK BOX)
- □ Activated charcoal
- □ Disinfectants – e.g. chlorhexidine
- o Florinef
- o Mannitol
- o Itraconazole
- o Cryproheptadine
- o Imuran
- o Oxyglobin (a few)
- o Oxygen
- o Amphogel
- o Soloxine
- o Tapazole
- o Phenobarbital
- o Oxytocin
- o Dog / cat vaccines

### DERM / EAR
- □ Benadryl – oral and inj (lots)
- □ Flea and tick products
- □ Topical steroid spray
- □ Miconazole shampoo
- □ Betadine
- o Fly strike repellent
- o Ivermectin
- o Revolution
- o Mitoban dip – Amitraz
- o Ear cleaners – Otic Clear; Oti- Calm, etc.
- o Silver sulfadiazine
- o Cerumite
- o Otomax
- o Baytril otic
- o Otic Domeboro
- o Chlorhexaderm shampoo
o Clotrimazole

EYE
- □ Triple ab ointment (lots)
- □ Steroid ointment and solution (lots)
- □ Atropine ointment (lots)
- o Optimun
- o Eyewash
- o Artificial tears

DEWORMERS
- o Drontal plus
- o Panacur

INSULINS
- o Regular (supplied by owner)
- o Nph
- o Pzi

NUTRITIONAL SUPPLEMENTS
- o Nutrical
- o Cat laxative
- o Puppy / Kitten milk replacer

IV FLUIDS
- □ LRS (lots)
- □ 0.9% NaCl (lots)

ELECTROLYTE MINERAL
- o Potassium – oral and inj
- o Calcium – oral and inj
- o Dextrose
- o Vit B

GI DRUGS
- □ Peptobismol
- □ Lomotil
- □ Kaopectate
- o Pepsid – oral and inj
- o Carafate
- o Endosorb
- o Lactulose

WOUNDS
- □ Betadine scrub and solution (lots)
- □ Table disinfectant (lots)
- □ Sterile water or saline (lots)
- □ Antibiotic ointment pads
- o Impregnated sterile water pads
- o Collagen pads

LAB SUPPLIES
- □ Parvo tests
- o Microscope slides / cover slips
- o Quick stains
- o Fecal flotation solution
- o Mineral oil
- o Immersion oil

GENERAL MEDICAL SUPPLIES
- □ Alcohol
- □ Syringes and needles – all sizes
- □ IV catheters; butterfly catheters

NA

o Conofite

o Tetracycline ointment

o Oral lysine

o Flu stain (lots)

o NSAID drugs (lots)

o Glaucoma meds

o Optimune

o Pyrantel pamoate

o Albon

o Baby food

o Various prescription diets

o 0.45% / Dextrose (a few; not lots)

o Hespan

o Vit K

o Sodium bicarbonate

o Taurine

o L-carnitine

o Tylosin

o Propulsid

o Sulfasalazine

o Viokase

o Reglan oral and inj

o Fiber

o Nexaban

o Liquid skin wound closure

o Medicated skin wipes

o Alcohol

o Novalsan

o Urinalysis dip sticks

o Heartworm antigen tests

o FeLV / FIV tests

o Dermatology skin scrape blades, DTM media

o Schirmer tear test; fluorescein stain

o Gauze sponges and roll gauze

o Vet Wrap / white tape

o Biohazard bags / sharps containers
□ Can openers
□ Gloves, masks
□ Cleaning supplies – mops etc.
□ Office supplies
□ Vials for dispensing meds
  o Cotton – roll and balls
  o Tongue depressors / cotton tip applicators
  o Feeding tubes
□ Splints / cast material
□ Pill pushers
□ Pill pockets – dog and cat
□ Puppy / kitten nursers
□ Elizabethan collars
□ Leashes / muzzles
□ Fecal loops

EQUIPMENT
□ Small refrigerator
□ Catch pole
□ Fans / extension cords
□ Sterile packs for wounds / minor surgery
□ Microchip scanner
□ Clippers and blades
□ Calculators
□ Thermometers
□ Ophthalmoscope
□ Otoscope
□ Laryngoscope
□ Endotracheal Tubes
□ Oxygen and oxygen masks
□ Microscope and replacement bulb
□ Complete blood count and chemistry panel analyzer
□ Portable Xray
□ Portable ultrasound
□ Tonopen
□ Gas Anesthesia Machine
□ Centrifuge
□ Refractometer
□ Heating Pads
□ Scale
□ IV drip stand

The North Carolina State Animal Response Team has a Companion Animal Mobile Equipment Trailer ready to deploy anytime (see Figure 4-1). Towing requires a ¾ ton truck with electric brakes and 10,000 pound hitch. The contents are listed below.
Trailer Features:
- Standardized 7' x 16'
- Dual axles
- 10,000 lb GVW
- Electric brakes
- 5000 lb ramp door
- Side door
- Internal power and lighting
- Built in shelving

Standard Equipment:
- 45 Large folding cages/crates
- 15 Medium folding cages/crates
- 5 kW Generator
- 2 First Aid Kits
- Pressure washer
- Shop vacuum
- 6 mil sheet plastic
- 50’ Water hose
- 3 ea 50’ Power cords

Contents:
- 8.5 x 11 Poly envelopes for cages (200)
- Animal intake registration forms (250)
- Tab band collars for animal identification (1250)
- Coloured wrist bands for owner identification (1250)
- Registration log book (5)
- Polaroid camera and 10 film cassettes (1)
- Cable ties for envelopes on cages (1000)
- Flashlight (2)
- Plastic 100 x 16-20 ft wide to line walls (3)
- Corrugated mat 100 foot rolls for center aisle (1)
- Painter’s tape for plastic on walls (6)
- Disposable rubber gloves - pairs (200)
- Buckets (5)
- Scrub brushes (5)
- Pooper scoopers (5)
- Trash containers (2)
- Garbage bags (50)
- Boxes of plastic bags for feces pick up (5)
- Hand washing station (1)
- Quaternary disinfectant - bottle (1)
- Bleach - bottle (1)
- Spray bottles for cleaning cages/crates (2)
- Litter boxes (5)
- Litter scoops (5)
- Cat litter - pounds (100)
- Orange cone for inside walking area (1)
- Cages/Crates - large 48” X 30” X 36” (45)
- Cages/Crates - medium 30” X 19” X 22” (15)
- Bowls (50)
- Spoons/measuring cups to scoop food (2)
- Can opener (2)
- Hose to clean walking area - 1” x 50’ (1)
- Mop (1)
- Mop bucket with wringer (1)
- Shop vacuum (1)
- Pressure washer (1)
- Jack stands (pair) (2)
- Animal control pole (1)
Pet owners themselves can assist greatly before a disaster happens by being prepared. Local veterinarians can help in this task by teaching their clients what to do. Some disaster preparation items that owners should have on hand are:

- First aid kit
- A portable battery operated radio
- Batteries
- Water
- Extra fuel for vehicles and generator
- Prescription medicines
- Foods that require little or no cooking or refrigeration and a can opener
- Emergency cooking equipment (if necessary)
- A supply of food for your animals
- Flashlights and batteries and/or kerosene lantern
- Chlorine bleach
- Fire extinguisher
- Blankets
- Halters, lead shanks, saddles
- Animal medical and vaccination records
- Evidence of ownership of animals
- Sand bags and plastic sheeting
- Wire and rope
- Hand tools and shovel
- Games or books to entertain the family during long periods of isolation

4.1.2. Integration with First Responders

First responders consist of police and fire departments, poison control, hazardous material responders, animal control, primary investigators, and search and rescue personnel. Most of them have minimal to no experience in animal handling or restraint. To rescue animals, first responders may require the help of a veterinarian who has knowledge of animal behaviour to protect the rescuer and the animal. The vet would also help reduce the medical impact of moving an injured animal. First responders rescuing people must remain the priority task when required. People should not put themselves at grave risk to rescue animals. This would just cause greater strain on an already overworked system.

4.1.3. Human-Animal Bond

The AVMA definition of the human animal bond is “a mutually beneficial and dynamic relationship between people and other animals that is influenced by behaviours that are essential to the health and well-being of both. This includes, but is not limited to, emotional, psychological, and physical interactions of people, other animals, and the environment.”
There has been increased concern for animal welfare since the 1970s (Wingfield 2009). In the face of disaster, many people may refuse to leave their pets behind and won’t go with the rescuers. In the aftermath, pets provide important emotional support to people who have lost everything else. There were huge public reactions to the major failures in pet rescue after Hurricane Katrina. People were not allowed to take their pets onto rescue transportation or into human shelters. Subsequently, many refused to go with rescuers and others had to leave animals behind in homes that became flooded.

Morally, people today want to protect animals from suffering “far beyond overt cruelty.” Animals have become part of people’s families. They provide companionship, unconditional love, and comfort. This emotional bond demands that animals are cared for as much as possible during a disaster situation. Most people, including farmers, feel a moral obligation to care for their animals. Confined animals are dependent on humans for escape during disasters. Witnessing the suffering or euthanasia of animals can have profound psychological effects on people. In the case of wildlife affected, if the disaster is caused by humans, they have a moral duty to try to ease any animal suffering without endangering their own lives.

### 4.2. Earthquakes

#### 4.2.1. General Description and Probability of Occurrence

An earthquake is a sudden, violent wave-like motion of the earth’s crust and upper mantle created by sudden shifts between tectonic plates along fault lines. Earthquakes strike suddenly without warning and subsequent damage depends on the magnitude, depth and intensity. Aftershocks should always be expected as they can further damage already weakened structures. Coastal communities should also consider the possibility of tsunami waves. Earthquakes can cause secondary effects such as fires, landslides, unstable soils, and flooding. Earthquakes of medium size are measured using the Richter scale (local magnitude, \( M_L \)) on which a change of one point represents a change in energy by a factor of 30 (Government of Canada 2011). Larger earthquakes, greater than 7.0 \( M_L \), are usually measured on the moment magnitude scale (\( M_W \)).

In Canada, the strongest earthquakes have occurred near the Pacific Rim, St. Lawrence and Ottawa river valleys, and in the Arctic. The Canadian cities most vulnerable to earthquakes are Vancouver, Victoria, Ottawa, Montreal, and Quebec City. A seismic hazard map showing the relative risk across Canada is shown in Figure 4-2 (Natural Resources Canada 2011). About 1,500 earthquakes per year are recorded across Canada.

British Columbia has experienced four large earthquakes since 1700 (Natural Resources Canada 2011). The first one in 1700 was magnitude 9.0. The second, a magnitude 7.0 earthquake was recorded on December 6, 1918 near the west coast of Vancouver Island. The quake was felt across Vancouver Island and into Greater Vancouver. On June 23, 1946, a magnitude 7.3 earthquake occurred near Courtney, Vancouver Island. This quake was noticeable as far as Prince Rupert, BC. Canada’s largest earthquake was a magnitude 8.1 on August 22, 1949 on the Queen Charlotte Fault along the west coast of Haida Gwaii. This quake toppled chimneys, shattered windows, knocked over people and animals.
4.2.2. Impacts on Animals

Earthquakes can disrupt telephone communications including local cell phone calls. There may also be infrastructure failure of utilities and water supplies as well as electrical or gas fires. Damage to buildings in a wide area may become too dangerous to remain in, requiring evacuation of large numbers of people and animals. Earthquakes may also cause hazardous materials spills and release of sewage or farm animal wastes. Animals exposed to these materials will require decontamination. Wildlife may also be affected by spills from containment lagoons.

Many animals will be too severely injured to be saved and will require euthanasia. Others will be found dead and carcass disposal will become an issue. Some animals will need rescue from collapsed buildings, requiring specialized skills.

An earthquake can affect the behaviour of animals quite dramatically. Animals that are normally calm can become totally fractious and may also become nervous and apprehensive. They may react by biting, kicking, or scratching (CFBMC 2001). Care should be taken while handling animals after an earthquake since they may become aggressive out of fear or stress. Cats are naturally inclined to have vagrant behaviour, which will only worsen following an
earthquake. Most panicked cats will tend to hide in silence within their own territory rather than a huge distance away from their homes. Humane traps with small amounts of food and water may work to retrieve them. Dogs terrified by an earthquake most often will run away. They might not come to their owners when called while they are in a fight-or-flight mode. A human approaching in this instance appears dominant to the dog and he/she may just run away. After repeated calls to the dog by various people, this sound may become a cue that results in the dog being more likely to run away. People should use different sounds to attract the dog’s attention and not look or move directly towards them (Albrecht and Branson 2010).

Loss of power to a dairy farm will have serious impacts. Cows that cannot be milked can become ill and will have increased chance of acquiring mastitis and unrefrigerated milk will spoil. Trucks may also not be able to get to farms to pick up stored milk.

Earthquakes and hurricanes tend to have little effect on wild animals. The animals will naturally move to areas of safety where possible. Most reported damage from earthquakes is to man-made structures and the people inside them. Animals are often aware of the approach of tsunamis, which may follow ocean-based earthquakes, and hurricanes, allowing them to move to safer habitat. In areas where natural vegetation is present, native plants often mitigate the effect of tsunamis and hurricanes on wild animals.

After an earthquake, dogs may continue to have behavioural issues due to stress and fear of every noise or rumble. Owners stressed themselves from the incident just may not be able to handle taking care of these special needs animals. The either give them up for adoption to others or may choose to euthanize them. Other owners may also have had their homes destroyed and their rental situations don’t allow the pets. The animal shelters may not have room to take them all in. Assistance may be needed from shelters in other cities. Some of these stressed animals may require calming medications and tranquilizers.

4.2.3. Events and Video Footage

Christchurch, New Zealand:

New Zealand has experienced two earthquakes with significant numbers of deaths since 1843. The first in 1931 in Hawke’s Bay, 15 km north of Napier on east coast of the North Island, was a 7.8-magnitude quake and killed 256 people. The buildings in Napier were completely levelled. Minutes after the quake, fires started in chemist shops and burned many the remaining standing buildings. Many trapped people could not be saved as a result. Crew of a Navy ship in port were able to assist in rescue efforts. Ships with food, tents, medicine, blankets, and doctors also arrived from Auckland the next day. After the earthquake, new buildings were built much stronger and none more than five stories high.

The 7.1-magnitude Canterbury earthquake of 4 September 2010 caused significant damage to Christchurch but no fatalities. The epicentre was 40 km west of the city. On 22 February 2011, an earthquake of 6.3-magnitude struck 10 km southeast of Christchurch and resulted in 182 deaths. More than half the deaths occurred in the collapse of a TV broadcasting building. The effect was severe due to the depth of the earthquake only being 5 km and buildings already damaged from the previous quake. The area remained in a state of national emergency until 30 April 2011. A series of 16 aftershocks of magnitude 5.0 or more occurred up until 21 June 2011.
near Christchurch causing even more damage. The costs of rebuilding are expected to be around $16 billion.

The SPCA animal rescue team of 12 people reported that many pets were lost or distressed from the earthquake. The team had to assist human search and rescue efforts when they encountered aggressive dogs during home checks. Some owners did break into police cordoned off areas to rescue their pets due to increasing concerns as time went on. Urban Search and Rescue (USAR) search dogs were used to find people in the debris (Canterbury SPCA 2011). Care of these 28 USAR and NZ Police dogs was done by the Massey University Veterinary Emergency Response Team (VERT), as seen in Figure 4-3. This incidence required the first deployment of the VERT from Massey. Issues that the dogs faced included dehydration, bruises, scrapes, and dust in eyes and lungs.

Since the earthquake, over 10,000 pets have been microchipped in Christchurch and Canterbury to aid in reuniting them with their owners in the event of another disaster. This was accomplished through the SPCA “Chip your Pet for FREE” campaign. Microchipped pets allow veterinarians and shelter workers to spend more time treating animals and less time trying to determine who the owners are. Unmicrochipped animals can be adopted out to new homes after seven days on hold. Of those pets already microchipped prior to the February earthquake, 85% were reunited with their owners. Only 15% of those without chips could be reunited.

Figure 4-3. USAR dogs receiving treatment by Massey VERT in New Zealand.

More than 100 pets were left behind in Christchurch by owners after the February earthquake. Another 150 evacuated pets were housed at the local SPCA along with 194 stray animals. Yet another 350 had already been transported to other towns. Many pet owners whose homes were too badly damaged to return to were forced to give up their pets for adoption to new homes because animal shelters and their rental accommodations could not accommodate them. After several months in animal shelters, many owners also felt it was more humane to let them go to new homes. Other pets were being fed at the condemned homes
because of lack of shelter space. Organizations such as Helping you Help Animals (HUHA) retrieved some of these animals to re-home them by the owner’s request. Other owners had to or chose to euthanize their own pets.

Videos:
Christchurch: http://www.youtube.com/watch?v=ew03yC03h6Y&feature=relmfu
SAR team from China assisting: http://www.youtube.com/watch?v=EwPJ_NQ8HA8
Overview: http://www.youtube.com/watch?v=WWKqmQY5TJE

Port-au-Prince, Haiti:

On 12 January 2010, Haiti was hit with a magnitude 7.0 Mw earthquake, with an epicentre near the town of Léogâne, approximately 25 km west of Haiti’s capital Port-au-Prince (USGS 2010). Within 12 days, 52 aftershocks of 4.5 Mw or greater were recorded. A population of about 3 million was affected by the earthquake. The city of Port-au-Prince alone had an extreme population density of about 20,000 per square kilometre, much of which consisted of slums without proper streets (McClean 2010). The city of 1.7 million was designed for only 250,000 people and has no building codes. The government reported 200,000-300,000 deaths and 1,000,000 homeless. However, the United States Agency for International Development estimated the death toll to be more like 46,000 to 92,000 plus another 220,000 injured and 1.5 million homeless (Associated Press 2010).

The earthquake caused major damage in Port-au-Prince, Jacmel and other towns in the region. Communication systems, air, land, and sea transport facilities, hospitals, and electrical networks had been damaged by the earthquake, which hampered rescue and aid efforts; confusion over who was in charge, air traffic congestion, and problems with prioritisation of flights further complicated early relief work. Port-au-Prince’s morgues were quickly overwhelmed with many tens of thousands of bodies having to be buried in mass graves (Wikipedia 2010).

Eight days after the earthquake, SPCA International sent in an animal response expert to assess the impact on Haiti’s animal population and distribute aid. As an under developed country, many logistical challenges were encountered. Haitians tend to only view animals as important if they are a food source or used for transportation. This small country is home to about 5 million livestock, mostly goats and pigs, and over 500,000 dogs. Most of the dogs were wandering strays and there was only a small cat population because Haitians actually eat the stray cats. These stray dogs were malnourished, with mange, and untreated illnesses. The loose dogs for the most part were able to avoid falling debris during the earthquake. Badly injured animals were humanely euthanized. Stray cats that were still around, were able to fend for themselves and find food for themselves. Haiti has a fairly large number of donkeys for transportation, however they receive little medical care. They tended to be malnourished and ridden with internal parasites. SPCA International committed to an intensive rabies vaccination and education program to protect animals and people for the long-term.

The Animal Relief Coalition for Haiti (ARCH) formed as a partnership between the World Society for the Protection of Animals (WSPA) and the International Fund for Animal Welfare (IFAW) a few days after the earthquake to provide relief for the animal survivors. The group
included more than 20 of the world’s leading animal welfare groups. They had six objectives in a $1 million agreement with the Haitian government. As of 17 February 2010, ARCH had treated more than 1,600 dogs, cats, goats, donkeys, sheep, pigs and cattle with their Mobile Veterinary Clinic. The majority of them were dogs. Animals were vaccinated against rabies and Newcastle disease and treated for parasites and diarrhea. ARCH worked in Port-au-Prince and surrounding areas in an organized manner to improve animal welfare conditions, repair the local veterinary clinics, and reduce the threat of zoonotic diseases. Records were kept of the owner’s and dog’s names and new collars were placed on them. Some of the animals were strays, but they were still treated and left for the community to care for. No animal shelters exist in Haiti for housing them. ARCH also repaired the National Veterinary Laboratory and installed solar-powered refrigeration units for vaccine storage. Their work included educating locals on proper pet ownership and farm animal husbandry methods as well as training veterinarians for future disaster relief. They used public awareness campaigns to teach about disaster preparedness and animal health issues, including a children’s school program. By 3 May 2011, ARCH treated and vaccinated close to 68,000 animals and completed all of their objectives.

Videos:
ARCH: [http://www.youtube.com/watch?v=9n030-Y8aKY](http://www.youtube.com/watch?v=9n030-Y8aKY)
ARCH 6 mth update: [http://www.youtube.com/watch?v=nCc05kRrQoo](http://www.youtube.com/watch?v=nCc05kRrQoo)

Japan:

On 11 March 2011, a magnitude 9.0 Mw undersea megathrust earthquake struck 70 km east of Oshika Peninsula of Tohoku. The depth was 32 km below the seabed. This earthquake resulted in flooding, landslides, fires, building and infrastructure damage, and a nuclear incident with radiation releases. The 5 to 8 m upthrust of the seabed also created a massive tsunami wave up to 40 m high. Wave heights of 2 m were measured as far as Chile. The wave flooded an area of 561 km². The total reported impact to date on people in Japan is 15,641 deaths, 5,699 injured, and 5,007 people missing (Wikipedia 2011). This earthquake was large enough to cause considerable shifts in land masses and the earth’s axis. Japan is actually now 4 m wider than before. Power failures resulted in the inability to cool down the Fukushima nuclear power plant, causing major radiation releases. Radiation has been detected in ground waters in towns close to the plant and in beef from the area being sold in Tokyo.

The animal rescue response was headed by the Japan Earthquake Animal Rescue and Support (JEARS) Coalition formed by the local Japan Cat Network, HEART Tokushima, and Animal Friends Niigata. They had a no-kill policy and funded veterinary care such as vaccines, microchips, medications, food, and cages. The WSPA was also involved in caring for animals and providing funds for temporary animal shelters. An estimated 30,000 pets were known to be affected and an unknown number of pets and livestock were trapped in the exclusion zone near the nuclear power plant. Luckily, many owners did take their pets to the evacuation centres. Many pets left behind likely drowned. World Vets also sent in veterinarians to provide care to animals in the shelters. They also established decontamination protocols for animals exposed to radiation.
Videos:
CNN Anderson Cooper report April 20, 2011: [http://www.youtube.com/watch?v=nP1JJCeigPA](http://www.youtube.com/watch?v=nP1JJCeigPA)
JEARS Japan Earthquake Animal Rescue and Support, photo slideshow: [http://www.youtube.com/watch?v=n4fs0TxeR88&NR=1](http://www.youtube.com/watch?v=n4fs0TxeR88&NR=1)
Last Chance for Animals, dog tangled in netting: [http://www.youtube.com/watch?v=_mAjiyaX9Hzw&feature=related](http://www.youtube.com/watch?v=_mAjiyaX9Hzw&feature=related)
Two dogs saved themselves by getting onto a roof even though they were left tied up: [http://www.youtube.com/watch?v=83V-jpNticc&feature=related](http://www.youtube.com/watch?v=83V-jpNticc&feature=related)
Dog survives on floating roof of house at sea: [http://www.youtube.com/watch?v=UJBlZttz8QQ&feature=related](http://www.youtube.com/watch?v=UJBlZttz8QQ&feature=related)

The three recent major earthquakes described above had varying impacts on local communities (Table 4-1). The devastation in Haiti was severe due to the nature of underdevelopment and housing in the region. The lack of building codes and overpopulation of Port-au-Prince caused destruction of most homes affecting millions of people. In contrast, Christchurch has had strict building codes for decades for earthquake protection in a country that lies along major fault lines. The Japan earthquake itself did not create a great impact on buildings. However, the unexpected height of the tsunami created by the underwater location of the earthquake drowned many and destroyed vast areas along the coastline.

### Table 4-1. Summary and comparison of the three earthquakes discussed.

<table>
<thead>
<tr>
<th>Closest large city</th>
<th>Port-au-Prince</th>
<th>Christchurch</th>
<th>Sendai</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>12 Jan 2010</td>
<td>22 Feb 2011</td>
<td>11 Mar 2011</td>
</tr>
<tr>
<td>Magnitude</td>
<td>7.0 M_W</td>
<td>6.3 M_L</td>
<td>9.0 M_W</td>
</tr>
<tr>
<td>Distance (km)</td>
<td>25</td>
<td>10</td>
<td>70*</td>
</tr>
<tr>
<td>Depth (km)</td>
<td>13</td>
<td>5</td>
<td>32</td>
</tr>
<tr>
<td>Peak acceleration</td>
<td>0.5g</td>
<td>1.88g</td>
<td>2.99g</td>
</tr>
<tr>
<td>Tsunami</td>
<td>localized</td>
<td>localized</td>
<td>up to 40.5m</td>
</tr>
<tr>
<td>Population affected</td>
<td>3,400,000</td>
<td>376,700</td>
<td>~1,000,000</td>
</tr>
<tr>
<td>Deaths</td>
<td>~70,000 - 230,000</td>
<td>182</td>
<td>15,597</td>
</tr>
<tr>
<td>Missing</td>
<td>unknown</td>
<td>none</td>
<td>4,980</td>
</tr>
<tr>
<td>Animals affected</td>
<td>~100,000?</td>
<td>~800</td>
<td>~30,000</td>
</tr>
<tr>
<td>Cost (in billions)</td>
<td>$8-14</td>
<td>$20</td>
<td>~$200</td>
</tr>
</tbody>
</table>

* distance from shore; M_W - moment magnitude, M_L - local magnitude

### 4.2.4. References


4.3. Fires

4.3.1. General Description and Probability of Occurrence

A forest fire is described as an uncontrolled fire that occurs in the countryside or a wilderness area and is fueled by combustible vegetation. Forest fires are characterized by their size, the speed at which they spread, their potential to change direction, and their ability to jump gaps such as rivers and roads.

In Canada, forest fires are a common occurrence during the summer months, particularly in British Columbia, Alberta, Ontario, and Quebec. As demonstrated in Figure 4-4, in 2011, British Columbia experienced 440 forest fires and Alberta experienced more double that with a total of 934.

![Figure 4-4. Number of forest fires in Canada in 2011 and over the past 10 years, according to province (Natural Resources Canada).](image)

The large number of forest fires that occur in Canada translates into a massive area of land that is burned. This year alone, in Alberta, Ontario, and the Northwest Territories, more hectares have been burned than those provinces’ 10-year total, as shown in Figure 4-5.
4.3.2. Impacts on Animals

The impact that forest fires have on wildlife is generally not severe because animals instinctively know to move away or seek refuge underground, depending on the species (smaller animals such mice, snakes, and lizards will burrow underground). Generally, death is not the greatest impact that forest fires have on wildlife, but it does occur. The most vulnerable animals include young nestling birds and other slow-moving animals that cannot burrow underground. Animals can die as a direct result of the fire or as a result of smoke/noxious gas inhalation. Although death is not the biggest concern for wildlife during forest fires, temporary displacement is. Animals that are unable to survive in a scorched environment undergo a forced migration to find a suitable habitat that can support them. Because of Canada’s vastness, finding a new environment is generally not an issue, but in other countries, such as Indonesia, where land is being significantly encroached upon and wildlife habitats are dwindling, relocating can prove more difficult. This was the case with the orangutan population in Indonesia during the wildfires in November 2010.

In contrast to wildlife, livestock can be greatly affected by forest fires because their ability to flee is often impeded by property fences. For livestock to be able escape a forest fire, producers need to implement fire preparedness plans that involve the safe evacuation of animals, or at least allows them to flee without being impeded by fences. Dairy Australia put
together a fire preparedness toolkit to assist farmers and their livestock dealing with a fire threat.

4.3.3. Events and Video Footage

Australian “Black Saturday Bushfires”, 2009

A series of wildfires burned 450,000 hectares across Victoria, Australia in February 2009. High temperatures and fast wind speeds attributed to the 400 individual fires that were recorded. The fires had grave socioeconomic impacts and resulted in 173 human deaths, 414 human injuries, 2030 destroyed homes, and 3500 destroyed structures and buildings. In addition, the estimated agricultural losses included the deaths of almost 12,000 head of livestock (sheep, cattle, horses, goats, alpacas, poultry and pigs). Moreover, wildlife were also affected: kangaroos reportedly returned to their still smoldering home ranges due to their territorial instincts and suffered severe burns to their feet, while surviving koalas were left dazed and confused.

The International Fund for Animal Welfare (IFAW) deployed a team of veterinarians to assist wildlife injured by the fires, and the RSPCA assisted with the rescue relief of wildlife and pets.

Video:
IFAW Support:
http://www.ifaw.org/ifaw_united_states/general/australian_bushfire_photos.php?msource=DRO90201003#

Koala that survived bushfires drinks water from a firefighter:
http://www.youtube.com/watch?v=-XSPx7S4jr4

Slave Lake Forest Fires, 2011

Forest fires ravaged the small town of Slave Lake, Alberta in May 2011. 40% of the town was destroyed, 50% of homes were burned, and almost all 7000 residents had to be evacuated. Animal rescue groups raced to save as many animals as possible during the evacuation: the Edmonton Humane Society rescued approximately 300 animals, including dogs, cats, hamsters, guinea pigs, and parrots; they managed to reunite 85% of the pets with their owners.

Video:
Edmonton Humane Society Response:

Texas Wildfires, 2011

Wildfires wreaked havoc across Texas and burned over 3 million acres of land starting in November 2010. An ongoing drought and strong winds fueled the fire, and a state of emergency was declared in December 2011. The fires peaked in April and May of 2011, destroying over 170 homes. Firefighters rescued animals from homes and animal boarding
facilities. Some kennel workers were forced to free their boarding animals in order to allow them to escape the fires on their own. The Houston SPCA managed to successfully evacuate 40 horses, donkeys, and mini-horses to a safe location as well as offered assistance to evacuees in need temporary homes for their pets. Unfortunately, many ranches were not as lucky – livestock were left to flee on their own (see Figure 4-6), and the resulting death toll was devastating.

Figure 4-6. Cattle running from a wildfire in Texas in April 2011 (AP Photo/bigbendnow.com, Alberto Tomas Halpern).

Videos:
Houston SPCA Helping those in need: http://www.youtube.com/watch?v=ALJScGqpzlI&feature=grec_index
Houston SPCA Horse Evacuation: http://www.youtube.com/watch?v=dpWbwckbXVo
Nolan Country Ranch Property, TX: http://www.youtube.com/watch?v=K25GO93k-b0

4.3.4. References

Huff Post Green Canada, 2011. Texas Wildfires Burn 110, 000 Acres, Destroys 68 Homes.
4.4. Floods

4.4.1. General Description and Probability of Occurrence

Floods are defined as a “temporary covering by water of land that is not normally covered by water”. They can occur any time of the year and are caused by a variety of things, including: heavy rainfall, rapid snowmelt, and ice jams. Flash floods are the rapid flooding of low-lying areas that occur when precipitation falls too quickly on ground that has a reduced absorption capacity – they are generally associated with storms and heavy rainfall. Most flooding occurs when water in rivers or streams exceeds its maximum peak level.

All rivers in Canada will flood at some point – this is one reason why floods are the most common natural hazard in Canada. The average annual peak flow of rivers across Canada is shown in Figure 4-7. Another major reason contributing to the frequency of floods in Canada is the amount of precipitation that falls annually. One of the most frequent causes of flooding in Canada is the spring thaw of accumulated winter snow.
Flooding occurs across Canada for different reasons. After spring thaw, storms and heavy rainfall are the next most common cause of floods in eastern Canada. Flooding in the prairies depends on the depth of snow, snow water content, ground frost, and timing of the spring thaw. Flooding in the Rocky Mountains of western Canada is a result of rapidly flowing water down the steep mountain slopes. In the northern regions of the Yukon and Northwest Territories, floods generally occur after the spring ice break-up. Flooding potential exists in many urban centres across the country because Canadian cities are often developed along rivers and lakes.

The primary effect of floods is physical damage to structures such as buildings, homes, cars and roads. Secondary effects include: water contamination, which leads to a threatened drinking water source; water-borne diseases such as cholera and dysentery; food crop shortages and complete harvest losses; and health threats associated with the establishment of mold in structures such as homes and buildings.
4.4.2. Impacts on Animals

Floods have both direct (drowning) and indirect (loss of habitat, stranding, starvation) impacts on animals. Generally, large fast-moving animals (e.g. horses, kangaroos) can escape floodwaters, particularly if waters rise slowly. If water levels rise rapidly, as is the case in flash flooding, larger animals often survive by swimming, but they are more susceptible to drowning. Small, slow-moving animals (e.g. snakes, rodents, and invertebrates) are more vulnerable to drowning in floods, regardless of the speed at which water levels rise. Animals can become stranded and then face the threat of starvation or drowning, should water levels continue to rise. For animals fortunate enough to escape floodwaters, survival becomes difficult due to the loss of habitat and food sources.

4.4.3. Events and Video Footage

Queensland Floods, Australia 2011

In 2011, floodwaters in Queensland, Australia rose to their highest levels in 100 years, killing 35 people and affecting millions of domestic animals and wildlife. A major impact on wildlife was the loss of habitat – it is estimated that more than half of Queensland was submerged under floodwater. Since water levels rose slowly, many animals were afforded time to get away. However, many smaller animals such as rats, snakes, mice and invertebrates were not as fortunate (see Figure 4-8).

Figure 4-8. A snake seeking higher ground on a highway (Animals Australia).

Equine welfare groups are provided support for horses affected by the floods in the form of feed and medical supplies. In addition, local pounds put a temporary freeze on euthanasia so that owners might be reunited with their lost pets. Despite the immense flooding in rural areas, livestock did not appear to be impacted directly by the floods and managed to stay afloat (see Figure 4-9). The Queensland government offered financial assistance to producers for animal feed.
Pakistan Floods, 2010

The 2010 Pakistan floods, driven by monsoon rain, covered almost 800,000 square kilometers — roughly one-fifth of Pakistan's total area. The human death toll was close to 2000, and over 20 million people were affected by loss of property, infrastructure, and livelihood. Moreover, 10 million head of livestock perished, which combined with crop losses amounted to a 15% reduction in agricultural production.

The Pakistan Animal Welfare Society (PAWS) assisted in animal rescue efforts by sending veterinarians to afflicted areas to help injured animals and supply animal feed. The University of Veterinary and Animal Sciences in Lahore sent a group of veterinarians and students to assist with animal rescue efforts.

Videos:

4.4.4. References


4.5. **Hurricanes**

4.5.1. **General Description and Probability of Occurrence**

Hurricanes are violent tropical storms that sometimes hit eastern Canada between June and November. The strong winds of at least 120 km/h revolve around a center of low pressure called the eye. The storm includes torrential rainfall and surges of seawater that can cause widespread flooding. Hurricanes can be predicted and landfall time and location mapped in advance. However, the storm surge height is sometimes unexpected leading to major consequences if unprepared. About five hurricanes make landfall on the US every three years.

4.5.2. **Impacts on Animals**

The impacts on farm animals from a hurricane can be largely prevented through preparation since hurricanes are predictable. Farm animals can be moved to unsheltered areas where structures cannot collapse onto them. Animals can be protected from flying debris in the strong winds (Government of Canada 2011).

The impacts on wildlife can vary (Welch 2006). Changes to ocean turbidity, sedimentation, nutrients, and dissolved oxygen can affect some marine life. Fish and mammals can move out of the area. Sharks and dolphins may sense pressure or salinity changes prior to storms arriving. Turtles and other animals can be affected by floating debris that can be accidentally consumed, entangle them, or release toxins.

Problems occur with pets when they have to be left behind during evacuations. Owners are told they cannot take their animals to evacuation shelters and may believe they can return to their homes within a few days. Sometimes flood waters rise higher than expected after people evacuate and animals left behind drown, especially if left tied up.

4.5.3. **Events and Video Footage**

**Canada**

Hurricanes rarely affect Canadian coastlines because the drop in water temperature tends to slow down their movement. Hurricane Juan was unusual in that it intensified on its approach...
to Nova Scotia from Bermuda and did not weaken due to its fast forward motion. Waves heights outside Halifax Harbour reached up to 20 m and storm surges in the populated area of Halifax Regional Municipality reached 2 m. Winds peaked at 165 km/h just south of land. It made landfall on 29 September 2003 with winds of 162 km/h just down the shore of the capital city Halifax. The storm crossed north through Truro, NS and then weakened to a tropical storm over PEI. The storm caused over $300 million in damage and killed 6 people. The worst hit area was the urban area of Halifax itself due to the strongest wind gusts. There were minimal impacts on animals besides power outages.

Hurricane Igor was the most destructive storm to ever hit Newfoundland on 21 September 2010 even though at landfall is was downgraded to a tropical cyclone. It caused major damage to roads, communities, and buildings with wind speeds of up to 150 km/h and record rainfalls of more than 200mm within a 20 h period.

**Hurricane Katrina**

During Hurricane Katrina of August 2005, evacuation of people and pets became a huge problem. An estimated 8,000 animals were rescued and brought to temporary shelters which quickly became full. Another 600,000 pets were believed to have been killed or left without shelter. Many people refused to be rescued and leave their pets behind when helicopter pilots and rescue boat captains refused to load pets in order to hold more people. People who evacuated to the Superdome were allowed to bring their pets, but when they have to leave that space to go elsewhere, the pets were not allowed on the buses. Rescue shelters tried to find new homes for abandoned pets whose owners left them or were unknown. The Humane Society of the United States (HSUS) along with the Louisiana SPCA and many other groups, had hundreds of staff and volunteers working in Louisiana and Mississippi after the hurricane.

Many horses in the path of the flood waters from the storm surge were unable to stand in the water for long periods and could not keep swimming indefinitely. Most of the 10,000 fish at the New Orleans Aquarium died because the backup power ran out after four days, but most of their marine mammals and a large sea turtle survived. The Audubon Zoo was located on higher ground and lost only three animals out of 1,400. They also had good disaster planning.

Vast areas of wildlife habitat were destroyed including breeding grounds for marine mammals, brown pelicans, sea turtles, fish, and migratory species. About 20% of the local marshes were permanently overrun by water. Many wildlife refuges had to close. The storm caused oil spills from 44 facilities, most of which were contained on-site, but some oil did get into the ecosystem. No offshore oil spills were officially reported but some surface oil was seen in the Gulf of Mexico.

**Videos:**
Pet rescue: http://www.youtube.com/watch?v=csNEjnfGsTM
Washington Animal Rescue League: http://www.youtube.com/watch?v=GAQwZIGBor4
Stranded pets: http://www.youtube.com/watch?v=nCjm8WHNkt4&feature=related
Animal rescue: http://www.youtube.com/watch?v=LuJrP7Dthnw&feature=related
Muttschack.org: http://www.youtube.com/watch?v=OHBRECU7vLE&feature=related
4.5.4. References


4.6. Tornadoes

4.6.1. General Description and Probability of Occurrence

A tornado is a rotating column of air that extends down from a cumulus cloud to contact the earth’s surface. On average, tornadoes have wind speeds of 170km/h, extend approximately 80m in diameter, and travel several kilometers before dissipating. However, some tornadoes can exhibit up to 480km/h winds, extend across 3km, and travel for more than 100km. Tornadoes are rated on the Fujita Scale, which characterizes them according to their wind speeds and the damage they cause.

Tornadoes are common weather events in Canada, but are generally concentrated in southern Ontario and Quebec, interior British Columbia, western New Brunswick, and central Alberta, as seen in Figure 4-10. They can occur any time of the year, but the main tornado season occurs from April to October, and peaks in June and July. The number of annual tornadoes has increased in recent years. During the 1980’s and 1990s, there was an average of two tornadoes each year. In contrast, between 2008 and 2010, there has been an average of 20 tornadoes across the country each year.
4.6.2. Impacts on Animals

Animals are extremely vulnerable to the damaging effects of tornadoes. They can be killed directly by a tornado if they are in its path, and, worse yet, they can also suffer the indirect effects after a tornado has hit, such as displacement, starvation, and disorientation. Animal rescue teams generally find lost pets wandering around and rummaging through damaged remains. Most relief efforts involve collecting lost animals; providing food, temporary shelter, and veterinary care; and reuniting animals with their owners, when possible.

4.6.3. Events and Video Footage

Joplin, USA 2011

In May 2011, an EF5 multiple-vortex tornado hit the town of Joplin, Missouri, causing $3 billion in damages. The tornado was 1.6km in diameter and wind speeds reached in excess of 300km/h. Approximately 150 people lost their lives, and over 900 pets were separated from their owners and left homeless.

The Joplin Humane Society took in homeless pets, provided veterinary care to injured animals, and attempted to reunite many owners with their pets. In addition, the American
Society for the Prevention of Cruelty to Animals set up makeshift shelters in empty warehouses and parking lots and decided that none of the surviving pets would be euthanized. The Humane Society of Missouri (HSMO) was responsible for coordinated the relief efforts to rescue displaced pets. A detailed account of their efforts is described in section 2.2.7.4, but in summary, they canvassed damaged areas and collected lost animals, most of which were dazed and confused. Owners that were forced to leave their pets at home could contact the HSMO and they would send a team to the home to search for the missing pet.

Videos:
Humane Society Relief: http://www.youtube.com/watch?v=p2Vj0KWg5oY

4.6.4. References


4.7. Tsunamis

4.7.1. General Description and Probability of Occurrence

Tsunamis are large waves that can be caused by underwater earthquakes, landslides, volcanic eruptions, and sometimes meteoric impacts. They can occur with little warning in the ocean and large lakes and can travel at the speed of a jet plane (800 km/h). As a tsunami approaches the shallower waters close to shore the wave speed slows (to 50 km/h) and the wave height increases. Tsunamis can occur as individual waves or multiple ones following each other by minutes to hours. Tsunami heights can reach 60 meters or more (Government of Canada 2011).
4.7.2. Impacts on Animals

In general, tsunamis have low impact on wildlife and loose farm or companion animals since they seem to have the innate instinct to run to higher ground before landfall of the waves (Albrecht 2005). The impacts on the animals are greater after the tsunami recedes when habitats have been destroyed and food may be scarce. Pets caught directly in the path of a tsunami cannot run fast enough to avoid getting engulfed by the fast moving water.

The Japan earthquake and tsunami of 2011 did have a devastating impact on wildlife on small Pacific islands, especially nesting shorebirds (Goldman 2011). The US Fish and Wildlife Service estimated that the Midway Atoll National Wildlife Refuge lost more than 110,000 Laysan Albatross chicks, about 22% of chicks born that year, along with about 2,000 adults. Thousands of Bonin petrels were buried alive and thousands of fish were washed ashore where they suffocated on Eastern Island. Local zoos and aquariums were also impacted by shortages of gas, heater fuel, food and drinkable water.

An island called Tashirojima about 15 km off the coast of Japan is known as the “Cat Island” because cats outnumber the 100 aging human residents. Although they all survived the earthquake and tsunami, they were in desperate need of aid.

4.7.3. Events and Video Footage

In 1929, a 7 m tsunami struck Newfoundland’s Burin Peninsula following an earthquake in the Grand Banks area and 28 people drowned. This was Canada’s only tsunami or earthquake disaster causing death.

The Japan earthquake of March 2011 caused a 5 to 8m up-thrust of the seabed, which created a massive tsunami wave of up to 40 m high. Wave heights of 2 m were measured as far as Chile. The wave flooded an area of 561 km$^2$ in Japan within an hour of the earthquake. The destructive effects of the tsunami were much greater than the earthquake itself. Entire towns were wiped out and people did not flee to high enough elevations because the vast height of the waves was so unexpected. Over 90% of the deaths were due to drowning by the tsunami.

Videos:
Japan, Post-tsunami relief: http://www.youtube.com/watch?v=Qjwi0etZiaM
Tsunami, Miyako City: http://www.youtube.com/watch?v=0wYiNnHEGyY&NR=1&feature=fvwp
WSPA, Indian Ocean Tsunami 26 Dec 2004: http://www.youtube.com/watch?v=nX4H9IgyKwG

4.7.4. References