Hurricane Florence

Search Canine Illness and Injury Data

Deployment strategies for weather events are challenging due to their ever changing projected pathways. Experts within our FEMA USAR System strive to determine needed Type I, Type III, and modular team numbers to deploy, plus formulate their strategic placement to best respond to a disaster. Hurricane Florence presented such challenges over three states: Virginia, North Carolina, and South Carolina.

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IST Veterinary Specialist
September 2018


CONWAY
DOG PARK
EXIT ONLY

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Introduction

This report is the eleventh in a series by the author to document the occurrence of Search Canine illness and injury during deployment. This is the fourth report specifically to a hurricane weather event, Hurricane Florence. Prior papers include the Haiti Earthquake (2010)[1,2], Joplin, MO Tornado (2011)[3], Hurricane Sandy (2012)[4], Moore, OK Tornado (2013)[5], Colorado Floods (2013)[6], SR-530 Oso, Washington Landslide (2014)[7,8], Nepal Earthquake (2015)[9] , and most recently a joint report of Hurricanes Harvey, Irma, and Maria (2017)[10].

Resultant data is currently being used to modify and improve aspects of Search Canine care. Medical courses which include veterinary care modules are designed to cover a wide range of illness and injury however we can emphasize treatment of the most common conditions that occur during these deployments. Similarly, medical cache equipment, supplies, and medications are included that allow treatment for a wide range of conditions. Now we can modify the amount and type of items based on projected need for the most common issues. Preventative measures can also be employed to decrease the occurrence of these problems to which Search Canines may be susceptible based on these results.

Event History

Hurricane Florence began as a tropical storm September 1, 2018 over the Cabo Verde Islands off the coast of West Africa, peaking as a Category 4 hurricane with sustained winds of 140 mph. In the United States, it made landfall as a Category 1 hurricane September 14 over Wrightsville Beach, North Carolina, coming ashore with winds of 90 mph and severe storm surge. By 5 p.m. EST that day, Florence was downgraded to a tropical storm as it poured rain across the Carolinas and moved northeast. Slow moving at 6 mph, Florence produced heavy rainfall, across North Carolina. Early on Sunday, September 16, it diminished to a tropical depression, with winds of about 35 mph. By September 18, it was downgraded to a post-tropical cyclone, sustaining winds at 25 mph.

Florence produced extensive wind damage along the North Carolina coast from Cape Lookout, across Carteret, Onslow, Pender and New Hanover counties. Thousands of downed trees caused widespread power outages to nearly all of eastern North Carolina. Hurricane Florence produced record breaking storm surge of 9 to 13 feet and heavy rainfall of 20 to 30 inches, which produced catastrophic and life-threatening flooding. The hardest hit areas included New Bern, Newport, Belhaven, Oriental, North Topsail Beach and Jacksonville, along with Down East Carteret County, south of a line from Kinston to Cedar Island. A storm total rainfall of 34.00 inches was reported in Swansboro. Wind gusts of 106 mph were reported at Cape Lookout with 105 mph at Fort Macon.[11]

FEMA Deployment

On September 11, 2018, at the request of Regions III and IV, System resources were activated to deploy and stage prepared to support a Hurricane Florence response. Additional resources were deployed on September 13:

- Red Incident Support Team in Raleigh;
- Region III to support Virginia: two National Incident Management System (NIMS) type 3 US&R task forces (TN-TF1 & MA-TF1); and three MRPs-Water Rescue (UT-TF1, CA-TF1, & CA-TF5-A);
- Region IV to support North Carolina: Federal Search and Rescue Coordination Group; three NIMS type 1 US&R task forces (NY-TF1, NJ-TF1, & IN-TF1); four NIMS type 3 US&R task forces (MO-TF1, NE-TF1, CO-TF1, & AZ-TF1); and twelve MRPs-Water Rescue (NV-TF1, TX-TF1, CA-TF2, OH-TF1-A, OH-TF1-B, CA-TF4-A, CA-TF4-B, CA-TF5-B, CA-TF7-A, CA-TF7-B, MA-TF1, & NY-TF1)
- Region IV to support South Carolina: four NIMS type 1 US&R task forces (FL-TF1, FL-TF2, PA-TF1 & MD-TF1); one MRP-Water Rescue (FL-TF2); and one HEPP (FL-TF2)

On September 25 a Canine Human Remains Detection (K9 HRD) modular search team was created with 3 MO TF1 HRD canines staging in North Carolina and 1 PA TF1 HRD canine search team who was transported from South Carolina to join MO TF1 as requested by Region IV.

Abbreviations

BoO – Base of Operations
DVM – Doctor of Veterinary Medicine
F - Female
FEMA – Federal Emergency Management Agency
FS – Female spay; dog cannot birth puppies
GSD – German Shepherd Dog
Hazmat – Hazardous Material
HRD – Human Remains Detection
IAP – Incident Action Plan
ICS-205 – Deployed Teams Roster
ICS-206 – IST Incident Medical Plan
ICS-208 – IST Incident Safety Plan
ICS-208H - IST Incident Safety Plan Hazmat
IST – Incident Support Team
K9 – Canine
LF – Live Find
M - Male
MD – Medical Doctor
MN – Male, neuter; cannot sire puppies
NIMS - National Incident Management System
OAP = Operational Action Plan
TF – Task Force
US&R – Urban Search and Rescue
WhatsApp – a free messaging service application for download

Definitions for Reference

Mean = the average; the numbers are added and then divide by the number of numbers
Median = the middle value in the list of numbers
Mode = the value that occurs most often; if no number is repeated, there is no mode
Range = is the difference between the largest and smallest values

Executive Summary

Survey Response

Handlers from 12 of the 14 Task Forces that deployed with search canines responded to the survey - 65% (34 of 52) of the handlers reported on 67% (38 of 57) canines. There were some issues with the survey's fill-in design, which may have discouraged some from bothering to answer the survey. Computers and programs vary in their capacity to accept different document versions. Sending a survey in several forms may alleviate some of the confusion and frustration with outdated systems and software. On-line surveys involve a learning curve to properly set up and may be costly, but are another possible avenue to consider in the future.

Handlers

This was not the first deployment for the majority of handlers (94%), and most had been in the FEMA US&R system for several years. This provides opportunity for mentoring those on their first deployment as well as support the FEMA mission with confidence and fortitude. These handlers are highly attuned to their canines' wellbeing, especially with respect to their hydration, health status, and decontamination. Over a third deployed beyond 2 weeks, and they were well prepared to do so (except one handler who commented on needing to pack more dog food!).

Canines

Labrador Retrievers consistently make up the majority (53%) of deployed breeds. Most are between 4 and 7 years of age, and 89% had deployed previously. Type I teams deploy with 4 LF K9, Type III teams deploy with 2 LF K9s. The addition of HRD canines has been advantageous since the inception of this optional search mission 5 years ago, as seen with the HRD modular request by the state of North Carolina during this deployment. The addition of HRD K9s was accomplished by having a handler deploy with 2 K9s (1 LF, 1 HRD) or deploying with an additional handler. Nine of the 14 TFs did this.

Transportation

Vehicles are often used as shelters in forward staging areas are advantageous for all in very cold and very hot weather. This promotes handler and canine health and readiness to operate in extreme climes for longer periods of time. Acclimation to a new weather environment can take up to 2 weeks, so maintaining readiness is important. There were several concerns about the cooling ability of the vehicle in which some canines were transported. Other methods to help would be to wet down the fur, place them in front of a fan, park in shade (if available), and maintain hydration. Not a bad idea for the humans as well.

Base of Operations (BoO) and Staging

A variety of areas were used throughout the deployment. Local authorities were forthright in finding places for TFs to stage. Several times teams had to move as water rose and flooded their temporary base. Flooding was unprecedented in some areas of operation. Situational awareness was paramount to maintain safety.

Hazmat and Safety

Flood water contamination was of most concern to the handlers regarding exposure of their canines during operations. Local alligator and snake concerns were not a direct threat during the deployment, but red ants were. Although the handler did not respond to this survey, their canine was bitten by several red ants and required Benadryl treatments and pain medication.

Decontamination

Canine decontamination is well ensconced into the FEMA system. The Oso, WA Landslide[7] deployment brought to light the need to minimize detergents that rob canines of their protective coating (unless being used to break up petroleum products) in an effort to decrease skin infections that seem to increase in intensity in hot and humid environments. Also, caution about not using Simple Green on canines has been heard and heeded.

Medical and Veterinary Services

It is important that canines receive at least a cursory exam, even when they are not actively engaged in operations. Collapse, abrasions, dehydration can occur even during downtime as they did here. Many handlers praised their TF medical staff for their care of the canines. It takes a village!

Canine Illness

Although the illness rate was low (16%, 6 of the 38), 3 of the issues could have had serious consequences. Collapse, muscle breakdown, and the early signs of cancer must be understood so we can better prevent them in the future. A small sign may be just that, small, but sometimes it represents something more and should not be ignored.

Canine Injury

Injury occurrence was also low (11%, 4/38) and all minor issues. Prompt and appropriate discovery and treatment was the key, and proper bandaging techniques[7] allow canines to continue with operations safely and pain-free.

Author Comments

This was a challenging deployment for me as the IST Veterinary Specialist. Task Forces were spread out over 3 states. Once engaged, despite several road trips to teams, it was impossible to reach canines in theater without a boat or high water vehicle. The teams I was able to visit had canines in staging. I could examine them as needed, offer some advice, and make sure they had supplies and my list of local veterinary hospitals, although as flooding continued the status of many places changed. Having Dr. Jennifer Brown in theater with her Task Force allowed for immediate veterinary care for all nearby teams. She was an invaluable asset during this deployment.

Many never received the local clinic list through the Operational Action Plan (OAP), Incident Action Plan (IAP), or the free messaging download (WhatsApp) used by the Red IST. There were more than 20 clinics over the 3 states listed – too much data for the application. It would be good to have a separate canine-designated page of information in the OAP: 206-K9 Medical Plan page and 208-K9 Safety Plan and 208H-K9 Hazmat page. Also, knowing how many canines are deployed will help accountability in reaching everyone, and a readily available count of how many resources are available for different mission requests (live find versus HRD). This is easily solved by requiring the list of canine assets that are deployed be included on every Task Force roster submitted to the Program Office and the IST on their ICS- 205 (Task Force Roster).

It was an honor to have been requested as part of the HRD-specific mission request made by the State of North Carolina. It was an honor to serve with the Red IST.

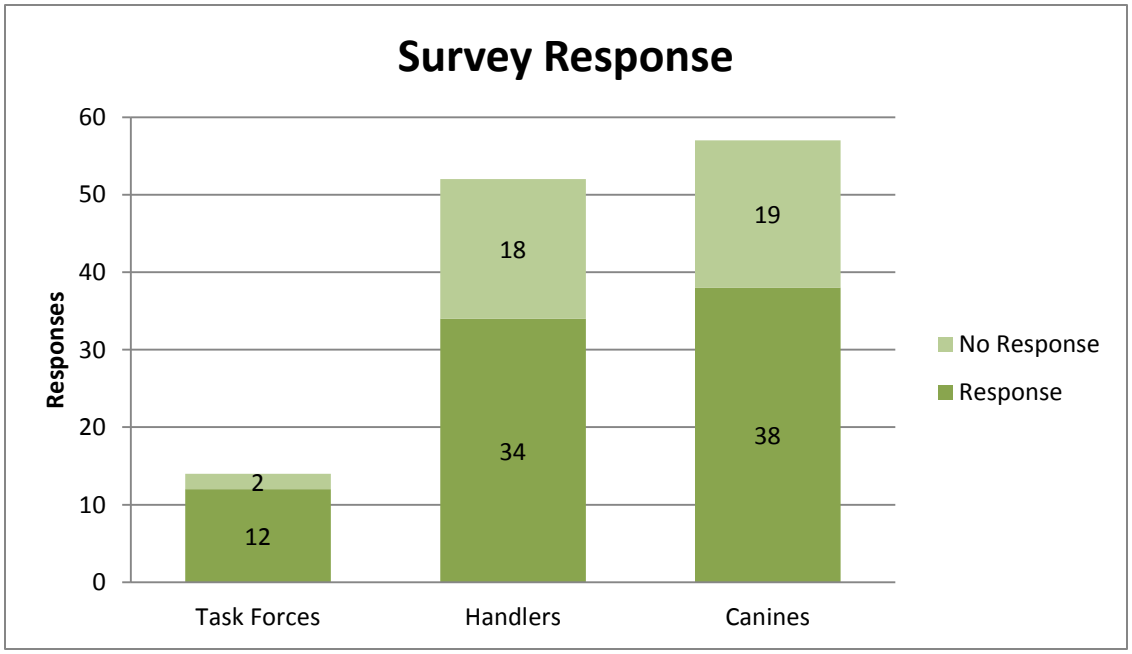
Lori E. Gordon, DVM

Survey Data Results

Response to Survey

In total 14 Task Forces deployed with search canines: 7 Type I and 7 Type III with a total of 52 handlers and 57 canines. Five handlers deployed with 2 canines – one live find and one HRD each. All handlers were sent a deployment canine illness and injury data survey via electronic mail.

- Handlers from 12 of the 14 Task Forces answered the survey
- 65% (34 of 52) handlers responded to the survey
- 67% (38 of 57) canines were represented in the survey

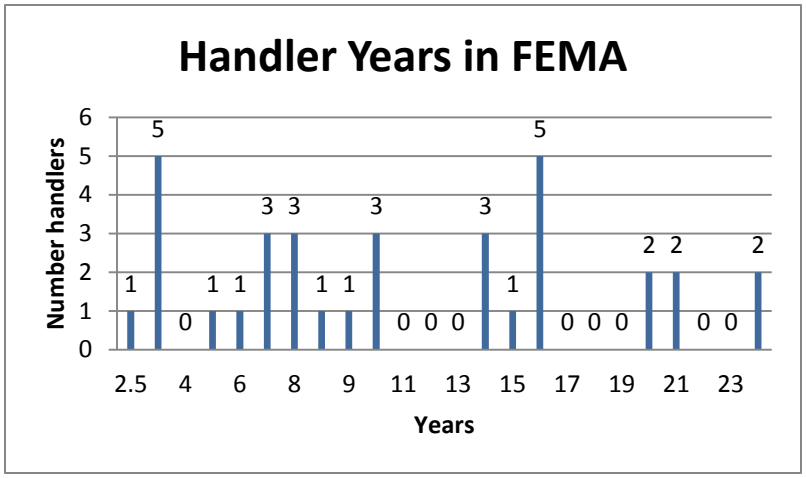


Handler Data

Experience

These 34 handlers accrued a total of 388 years in the FEMA system:

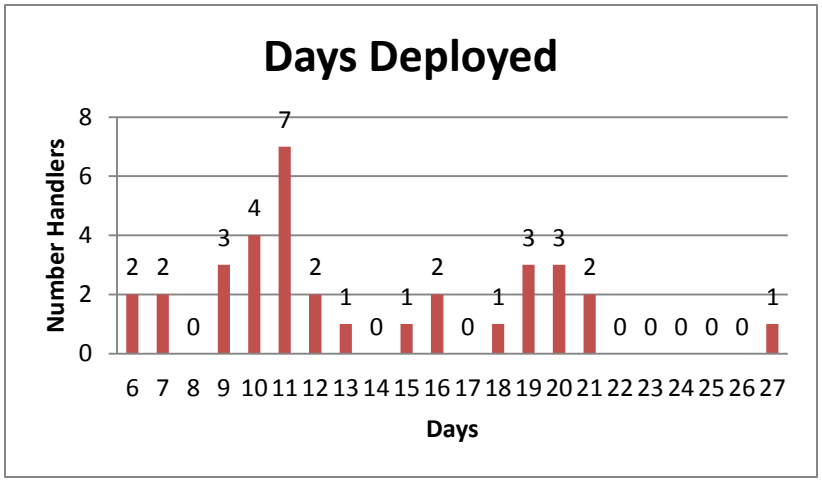
- Mean 11.4 years
- Median 10 years
- Modes were 3 years and 16 years
- Range 2.5 to 24 years



Days Deployed

This was the first deployment for 2 of the 34 (6%) handlers; 32 (94%) had previously deployed. These 34 handlers accrued a total of 458 days deployed for Hurricane Florence.

- Mean of 13.5 days
- Median of 11 days
- Mode of 11 days
- Range was 6-27 days

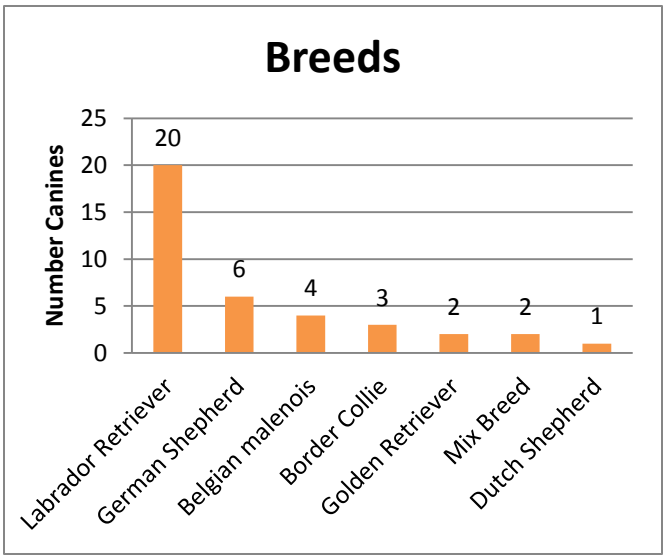


Deployment Experience

- 94% (32/34) handlers had deployed previously
- 6% (2/34) this was their first deployment

Canine Data

Surveys received 67% (38/57) canines deployed



Breeds

- Labrador Retriever 53% (20/38)
- German Shepherd 16% (6/38)
- Belgian Malenois 10.5% (4/38)
- Border Collie 8% (3/38)
- Golden Retriever 5% (2/38)
- Mix (GSD-Mal, Lab) 5% (2/38)
- Dutch Shepherd 2.5% (1/38)

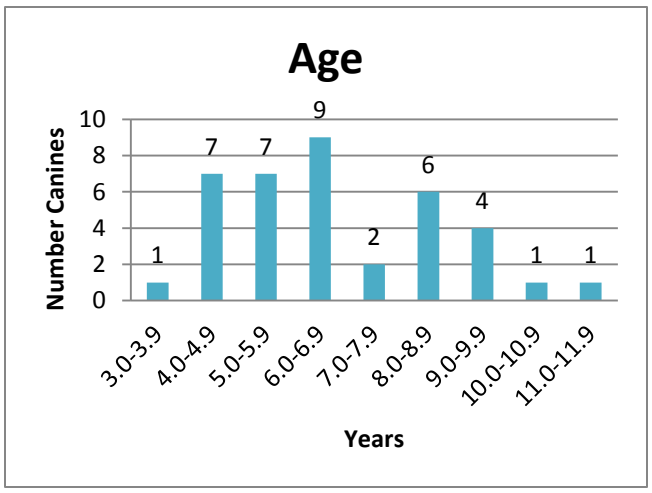
Age

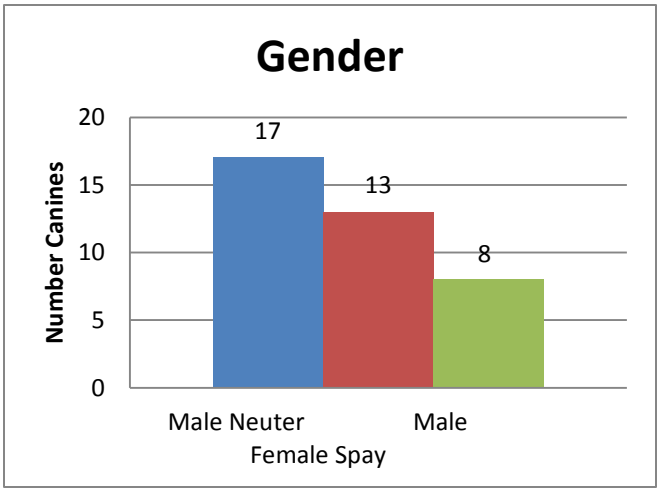
These 34 canines accrued a total of 3,033 months in age (252 years 9 months).

- Mean age 79.8 months (6 years 8 months)
- Median age 78 months (6 years 6 months)
- Mode age 72 months (6 years 0 months)
- Range was 37.5 months to 132 months (3 years 1.5 months to 11 years 0 months)

Gender

- 45% (17/38) male neuter (MN)
- 34% (13/38) male intact (M)
- 21% (8/38) female spay (FS)
- 0% (0/38) female intact (F)



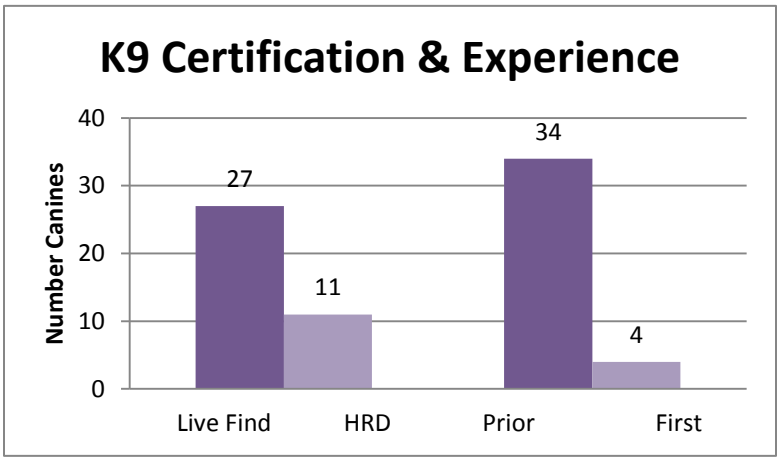


Search Certification

- 71% (27/38) Live Find Canines
- 29% (11/38) Human Remains Detection Canines

Deployment Experience

- 89% (34/38) canines had deployed previously
- 11% (4/38) this was their first deployment



Transport

- 100% (34/34) of handlers and 100% (38/38) canines mobilized via ground transport
- 94% (32/34) handlers and 95% (36/38) canines demobilized via ground transport
- 6% (2/24) handlers and 5% (2/38) canines demobilized via ground and commercial air; 1 incident involved K9 lunging at baggage handler* (see incident note page 20)

Base of Operations and Staging

Task Force Bases of Operation and forward staging encompassed a variety of locations and venues across 3 states. A few are listed, but many more were visited.

- North Carolina: Trenton, Kinston, Elizabethtown, Washington, Charleston, Pembroke, Raleigh, Wilmington, Bolivia, Rocky Point, Leland, Bayboro, Fayetteville, Monroe, Charlotte
- South Carolina: Columbia, Lake City, Myrtle Beach, Manning, Dillon, Pauley's Island
- Virginia: Fort Lee, Pulaski

Staging areas also varied in type, size, and accommodations.

- Hotel, tent, National Guard base, High school, airplane hangar, warehouse, university gym, airport terminal, mall store, fire station, EOC building, government building, 4-H resource center, sports coliseum, church, recreation center, police barracks, community center, and armory barracks

Hazmat and Safety

Weather conditions ranged over the month of September form mid-60s°F to high-80s°F. Winds varied from 10 to 30 miles per hour. Precipitation ranged from zero to light to heavy, with occasional thunder storms. Concerns for the search canines varied based on conditions in which they were operating: hypothermia when cold and wet, hyperthermia when hot, with and without full sun.

Flood waters concerns included contamination with sewage, both human and animal (chicken, hog), natural gas and petrol chemicals, radiation from healthcare sources, agricultural pesticides and fertilizer, coal ash heavy metals, lead and asbestos.

Animal awareness included alligators (keep distance; extremely powerful and fast moving, like heavy vegetation and water's edge to ambush prey) and snakes (assume snakes in water are venomous).

Insects of concern were fire ants, who when disturbed can swarm onto a body very quickly, and the bites may cause mild local swelling to severe life-threatening anaphylactic shock. Fleas, ticks, mosquitos, bees and wasps are also endemic to the south.

Endemic diseases include tick-borne (Borrelia/Lyme, Anaplasma, Babesiosis, Ehrlichiosis, Rocky Mountain Spotted Fever, and Tularemia), mosquito transmitted (Heartworm disease, West Nile Virus, and Eastern Equine Encephalitis), and water-borne Leptospirosis (transmissible to and from humans/zoonotic). All handlers are aware to use monthly preventative medications for their search canines, to bring additional supplies should their deployment extend beyond the next due date for these drugs, and discourage drinking from standing pools of water.

97% (33/34) handlers reported receiving hazmat briefings during their deployment. One handler survey had no answer for this section so was not included in this section.

- 100% (33/33) weather information
- 100% (33/33) contaminated flood waters
- 79% (26/33) local animal issues
- 76% (25/33) local insect concerns
- 21% (7/33) endemic diseases

Red Ants form ball and float on water

Decontamination

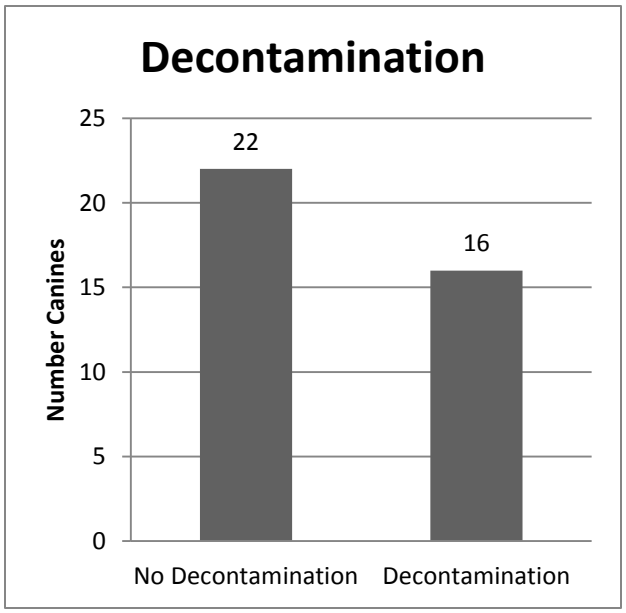
Handlers from 12 of the 14 Task Forces answered the survey.

Decontamination stations for canines were reported:

- 8 of the 12 task forces had one
- 2 of the 12 task forces did not
- 2 TFs had 2 handlers that each reported different answers – 1 yes and 1 no

Canines Decontaminated

- 58% (22/38) canines did not require decontamination
- 42% (16/38) canines went through decontamination
    - 100% (38/38) had soap and water used for the procedure
    - 97% (33/34) handlers reported contaminated flood waters and flood residue on land as the reason for needing their canines decontaminated
    - 3% (1/34) a handler reported no need, but they used station as a training



Medical and Veterinary Services

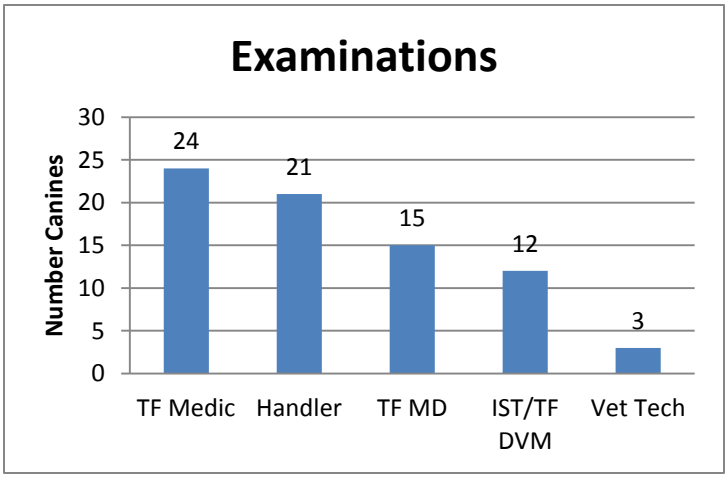
Canine Examination

Pre-mission veterinary examinations are required before canines deploy. Once deployed, handlers and Task Forces are responsible for canine care, as there may or may not be available veterinary services on and/or off site.

Some TFs perform K9 exams on a daily bases as they do for human team members. Others perform exams based on determined need – for example whether or not the K9 went operational. Examinees include handler, TF MD, TF Medic, veterinarian, and veterinary technician.

33 Handlers provided a survey answer; one handler did not and was not included in this section.

- 73% (24/33) canines received examinations from TF Medics
- 64% (21/33) canines received examinations from their Handler
- 45% (15/33) canines received examinations from TF MD
- 36% (12/33) canines received examinations from a veterinarian
- 9% (3/33) canines received examinations from a veterinary technician



Veterinary Services

- 91% (31/34) Handlers reported veterinary services were available
- 9% (3/34) Handlers reported no veterinary services available

Of the 31 Handlers reporting services available

- 58% (15/31) had access to off-site local veterinary clinics/DVMs
- 35% (11/31) had access to off-site clinics and IST Veterinary Specialist (Dr. Gordon)
- 16% (5/31) had a with their TF a team veterinarian available (Dr. Brown)

Canine Illness - Occurrence of illness to the canines during Hurricane Florence was low.

- 84% (32/38) exhibited no illness
- 16% (6/38) incurred illness

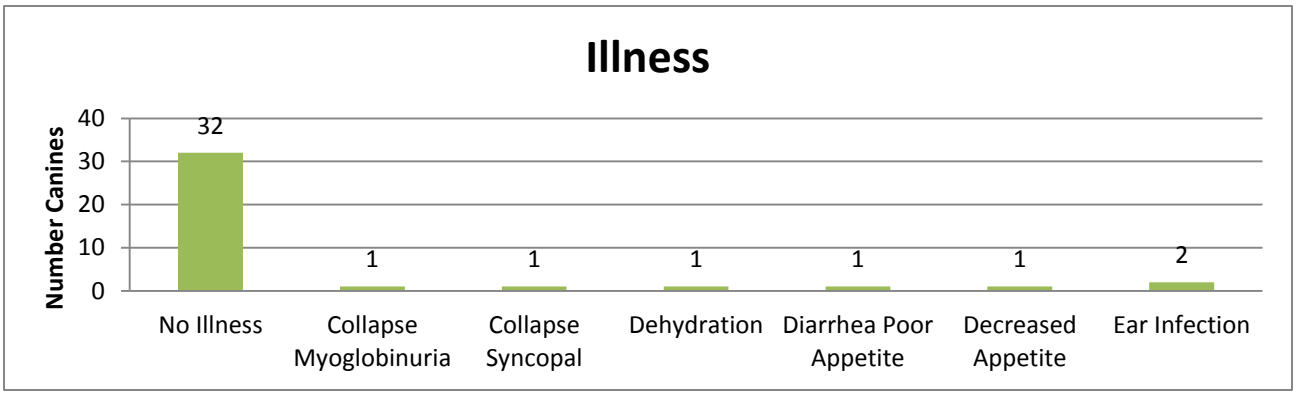
Canine A – 9.5 year old MN Labrador Retriever
Canine developed brown urine after a collapsing episode that occurred during outside exercise. Subcutaneous fluids were administered for suspected dehydration; canine responded positively to fluids and rest. Examination performed days later was within normal limits, and the urine was normal. It was revealed the canine had brown urine in the past which was diagnosed as hemoglobinuria, a product of severe muscle breakdown. Due to history and recent recurrence, it was advised the canine not be used in search or stressful situations (weather extremes, exercise).

Canine B – 6 year old MN Dutch Shepherd
Upon arrival at first staging location, the canine collapsed and exhibited a syncopal episode (brief loss of consciousness). Treatment included subcutaneous fluids and rest, and the canine recovered without further incident. During pre-mission veterinary check, canine was given flu vaccine and flea/tick preventative in addition to what handler had already administered. There was concern this was a reaction to the vaccine, the additional flea/tick medicine, or combination.

Canine C – 8.5 year old M German Shepherd
Canine had decreased appetite, otherwise normal. Physical examination was normal (attitude, hydration, heart, lungs, color, abdomen, and gait), with old-age changes of eyes and teeth. Appetite remained decreased at home, and canine began losing weight. Canine passed FSA test then developed swollen abdomen. Sadly, liver masses were found; canine was euthanized.

Canine D – 4 year old M Golden Retriever
Canine developed loose stool and had decreased appetite. Handler treated with probiotics for 5 days, and the issues resolved.

Canines E and F – 11 year old M Labrador Retriever and 4.25 year old FS Labrador Retriever
Canines had an ear infection, cleaned, treated with ear medications; both resolved in 5-7 days.



Canine Injury

Occurrence of injury to the canines was low.

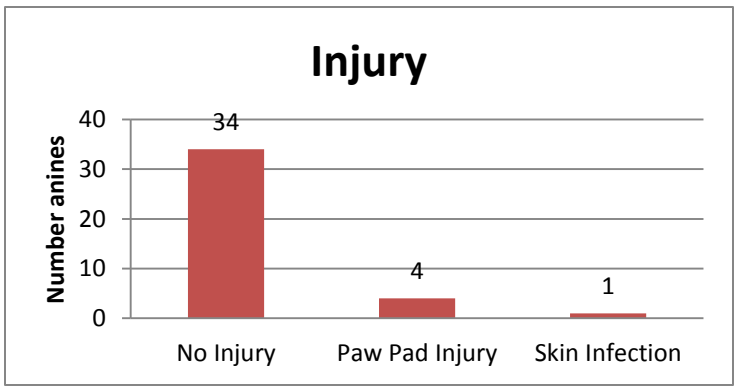
- 89% (34/38) exhibited no injury
- 11% (4/38) incurred injury

Canine B – 6 year old MN Dutch Shepherd
This canine had the collapse/syncopal episode early in the deployment (previous page) but recovered without incident. All 4 paws had abrasions: metacarpal pads (front limbs) and metatarsal pads (hind limbs). There was mild lameness of the right front leg and sensitivity to the pad. There were also superficial skin irritation to the inner left thigh and inner lower hind limb. Rest and plans to bandage paws or wear booties if searching were recommended. The next day there was no lameness, pads healing, skin less irritated.

Canine F – 5.5 year old MN Belgian Malenois
Canine had portion of a metatarsal (hind limb) pad torn; there was some bleeding at the site and the canine was lame after the injury. The TF medic cleaned the area and applied topical antibiotic and a bandage. Antibiotics and non-steroidal anti-inflammatory were dispensed. The lesion markedly improved within 48 hours and the canine was ambulating well.

Canine H – 6.25 year old MN Labrador Retriever
Canine had abrasions and a laceration to the front paw pads. The TF medic cleaned and bandaged the areas, but there was concern about the laceration. The canine was taken to a local veterinarian who removed the bandages and prescribed antibiotic powder, oral antibiotics, and a non-steroidal anti-inflammatory. The injuries resolved within 5 days.

Canine I – 8.5 year old MN Labrador Mix
Canine had abrasions to both front metacarpal pads. The TF veterinarian cleaned, applied antibiotic ointment, and bandaged them. A non-steroidal anti-inflammatory medication was dispensed. Lesions resolved in 2 days.



Handler Comments

Medical Support

- Located local vet hospitals close to staging and search areas once arrived
- IST hospital info delayed; contacted NC State & Local on own
- Docs and medics were very involved in checking on the canine's welfare every morning, and throughout the deployment
- Doctors and medics were as concerned about the canines as the humans on the team, great support. Great that the IST vet paid a visit to check on the canines as well!
- Have a vet tech on hand 24/7
- Overall I believe the mission went well because there were no injuries or issues with any of the K9s. The only improvement would be a dedicated vet tech deployed with task force
- Great MD support - proactive in the event of injury; TF MD contacted closest vet hospital
- TF medics outstanding in treating my canine's paw injuries and follow up

Transportation and Vehicles

- Transport via van - van had poor air conditioning
- Having a place to keep K9s cool should be main focus
- Better transport conditions for K9. K9 transported on bus on floor with rest of the team.

Decontamination

- Operated in partially collapsed structures where flood waters had receded; K9 had paws decontaminated after every mission

General

- Not used for any searches; TF supported K9s well
- We extended past 14 days; I need to pack more dog food
- Canines never searched but received a lot of team support with care and love!

Demobilization Incident

At an airport departure gate, a search canine lunged at a baggage handler as they came out of the gate. The airport personnel did incur a leg injury and was taken to a medical facility for evaluation. No further details were relayed. Information regarding state regulations for handling dog bite incidents was requested and a web site with all the data was relayed to the IST Medical Specialist.

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