Hurricane Michael

Canine Illness and Injury Data Report

FEMA US&R

October 1, 2018
Lori E. Gordon, DVM
IST Veterinarian

Table of Contents

Introduction

This report is the twelfth in a series of reports by the author to document the occurrence of Search Canine illness and injury during deployment. This is the fifth report specifically for a hurricane weather event, Hurricane Michael. 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], joint report of Hurricanes Harvey, Irma, and Maria (2017)[10], and Hurricane Florence (2018)[11].

Patterns of data are emerging which are used to modify and improve FEMA System training, preparedness, and prevention in the field. In regards to medical training there is emphasis on what actually happens to these canines in addition to a responsibility to cover a wide range of potential illness and injury issues. There are yearly modifications to our cache with respect to the types and numbers of supplies and equipment needed to better prepare for medical issues the canines are most likely to experience. Information gathered also guides handlers and medics to be better educated in prevention methods in an effort to decrease the incidence of the most common detrimental conditions these canines experience.

Event History

The thirteenth named storm, seventh hurricane, and second major hurricane of the 2018 Atlantic hurricane season, Michael originated from a broad low-pressure area that formed in the southwestern Caribbean Sea on October 2, 2018. The disturbance became a tropical depression on October 7, 2018 after nearly a week of slow development. By the next day, Michael had intensified into a hurricane near the western tip of Cuba, as it moved northward. The hurricane strengthened rapidly in the Gulf of Mexico, reaching major hurricane status on October 9, 2018 peaking as a high-end Category 4 hurricane on the Saffir–Simpson scale.

Approaching the Florida Panhandle, Michael attained peak winds of 155 mph (250 km/h) as it made landfall near Mexico Beach, Florida, on October 10, becoming the first to do so in the region as a Category 4 hurricane, and making landfall as the strongest storm of the season. As it moved inland, the storm weakened and began to take a northeastward trajectory toward Chesapeake Bay, weakening to a tropical storm over Georgia, and transitioning into an extratropical cyclone off the coast of the Mid-Atlantic states on October 12, 2018. Michael subsequently strengthened into a powerful extratropical cyclone and eventually impacted the Iberian Peninsula, before dissipating on October 16, 2018.[12]

FEMA Response

Emergency Support Function (ESF) #9 Advisories on current operations regarding system resource activations were distributed throughout the deployment.

October 8 and 9, 2018, at the request of FEMA Region IV, initial activations consisted of:
- Red Incident Support Team (Red IST)
- Two NIMS type 1 US&R task forces (TN-TF1 & TX-TF1)
- Two NIMS type 3 US&R task forces (PA-TF1 & NJ-TF1) - *Increased to Type 1 10/10/18*
- Six Water Rescue Mission Ready Packages (MRPs) (IN-TF1, OH-TF1, VA-TF2, MO-TF1, VA-TF1 & MD-TF1)
- One HEPP (TX-TF1)

October 11, 2018 the six Water Rescue MRPs were divided to fulfill additional missions:
- Two Mission Ready Packages – Water Rescue (VA-TF2 & MD-TF1)
- Four Mission Ready Packages (MO-TF1, VA-TF1, IN-TF1, & OH-TF1) to Panama City conducting ground based wide area search operations

October 12, 2018 the two Water Rescue MRPs (VA-TF2 & MD-TF1) were reassigned to conduct ground based wide area search operations in the Panama City/Mexico Beach areas along with the other four MRPs (MO-TF1, VA-TF1, IN-TF1, & OH-TF1).

October 13, 2018 a request was received from Florida for 12 Canine search Teams – Human Remains Detection (CST-HRD) and was filled using a combination of certified HRD canines already in theater, and the deployment of additional CSTs-HRD from four of the deployed System task forces (TN-TF1, OH-TF1, MD-TF1 & MO-TF1).

Abbreviations

BoO – Base of Operations
CST-HRD – Canine Search Team – Human Remains Detection
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
HEPP – Hazardous Materials Equipment Push Package
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
MRP – Mission Ready Package
NIMS - National Incident Management System
OAP = Operational Action Plan
PE – Physical Examination
TF – Task Force
US&R – Urban Search and Rescue
WNL – Within Normal Limits

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

<u>Survey Response</u>
All 8 task forces who deployed with canine search teams were represented in this survey. More than half deployed handles responded (60%, 15/25) representing more than half the canines (64%, 18/28). The ultimate goal is 100% response, which occurred once (Oso, WA Landslide[7]) out of the 12 data surveys. The percentage response for this paper is an acceptable representation.

<u>Handlers</u>
The majority of handlers (80%, 12/15) had prior deployments in the FEMA System, and the average time with their task force was 9 years, 7 years being the most common period. Their experience is invaluable to first time deployment team members, and they are well versed in the care of their canines as could be seen by the care taken to keep them hydrated and avoid heat stress. This makes their search partners able to carry out their search missions with the confidence of a job well done.

<u>Canines</u>
As it is reflected in the breeds of certified search canines in the FEMA System, Labrador retrievers top the list for most common breed. All the canines, no matter their age, gender, or breed, are kept to the same standards and performance to ensure their results are dependable. They cleared many areas as well as alerted personnel to areas of human loss.

<u>Transportation, Base of Operations and Staging</u>
No issues. There were some comments about needing better air conditioning for the canines to stage during wait times between missions. Most vehicles were well-equipped to handle being a cool and shaded resting place for canines and humans alike. These mobile cooling stations were instrumental in maintaining canine health and well-being, as well as shortening needed rest times to cool down between missions.

Hazmat and Safety

Hazmat and safety issues for consideration may not always be formally presented at a briefing. Some canine units hold their own briefing specific to canine issues. Much of the information may be ingrained in the more experienced handlers. Documentation in the OAP and IAP specific for canines is highly recommended in an effort to assure all handlers are fully informed of these concerns (206H-K9 Hazmat Plan).

When handlers from another part of the country deploy to an unfamiliar environment, hazards that are routine for local residents are unusual for travelers. This is why endemic diseases, animals and insects are included in the safety message. Plant and tree hazards are another addition to this message, which is sometimes over looked (sharp spikes on palm trees, widow-maker trees).

Situational awareness regarding two additional hazards when searching through debris are gaining in frequency: firearms (found at Mexico Beach) and drugs (no known exposure this deployment).

The addition of naloxone hydrochloride (Narcan™) to a standard search pack is becoming increasingly necessary when performing search operations. However we must be aware that this is an antidote for narcotics, and not for all the potential drug contamination that may be present.

Canines have very tough and well-protected paws. They walk on thick-layered pads and normally these offer protection from most substances. But beware! Search canine paws are frequently exposed to touch surface conditions and long search missions. Their pads are often worn down, bringing the sweat glands in the pads closer to the surface and more exposed. These glands can, and do, absorb toxins they come in contact with, adding to canine potential exposure from other routes: ingestion, inhalation, and injection. Decontamination and vigilance in medical checks provide treatment and prevention efforts.

Decontamination

Due to the flood water contamination concern, all canines exposed to water or areas where water had receded received decontamination. Multiple uses of detergents (Dawn) can erode the protective skin oil layer and cause dry irritated skin. Add to that the hot and humid conditions, and skin infections are likely to occur. An oatmeal-based dog shampoo and meticulous drying after decontamination may decrease the number and/or severity of skin infections.

Medical and Veterinary Care

As the IST Veterinarian for this deployment, I was able to be present at the areas of search operations and interact with the handlers directly. This allowed for specific information regarding canine medical issues, the ability to conduct physical examinations for accurate diagnoses, and provide immediate and direct treatment.

Some deployments may not have veterinary clinics or teams nearby, and System medics and MDs are responsible for canine care. I was concerned that 3 of 4 handlers on the same task force were unaware of any veterinary services either within the System or in the area. I believe this should be a question that handlers ask themselves and their task force, and make attempts to discover. Not necessarily as the primary care service, but as back up for advanced care needs or medications or questions.

Canine Illness

Considering the hot and humid search conditions, the lack of any heat stress or dehydration issues is a testament to the care given to addressing work-rest cycles and preventative measures to avoid these conditions – watering down fur, seeking shade, limited search in full sun, encouraging frequent water intake, monitoring for signs of fatigue.

Canine Injury

Paw pad injuries are the most common issues observed in most deployments, regardless of the environment search operations are conducted. These are the most vulnerable body parts to injury. Attention to canine gait, frequent medical checks before, during and after search, prompt treatment, and protective bandaging all contribute to success in maintaining canine operational capability even with injury.

9

Author Comments

This was a very involved deployment for me. In addition to the management and information gathering and paperwork, I was able to perform hands-on examinations, have face-to-face intelligence directly from the handlers, and provide immediate treatment where operations were on-going. At one decontamination station where soap could not be found in the cache, I advised against the inadvertent use of an industrial cleaner and degreaser not meant for use on living tissue (Simple Green); other soap was located from a personal pack. There are also many teachable moments when treating a canine that human medics and MDs can observe, ask questions, and use their skills on the canines. It was a very good experience and I was honored to have been deployed. A special thank you to TN-TF1 for hosting and housing me at their BoO located at Mexico Beach.

Survey Data Results

Response to Survey
Eight System task forces deployed for Hurricane Michael with search canines in their team roster. All task forces were represented in the survey.

In total there were 25 handlers with 28 canines:
- 11 handlers each deployed with a LF K9
- 11 handlers each deployed with HRD K9
- 3 handlers deployed with 2 K9s – 1 LF, 1 HRD

All handlers were sent a Hurricane Michael K9 Illness and Injury Data survey by electronic mail. One or more handlers from all 8 of the deployed task forces answered the survey:
- 60% (15/25) Handlers responded to the survey
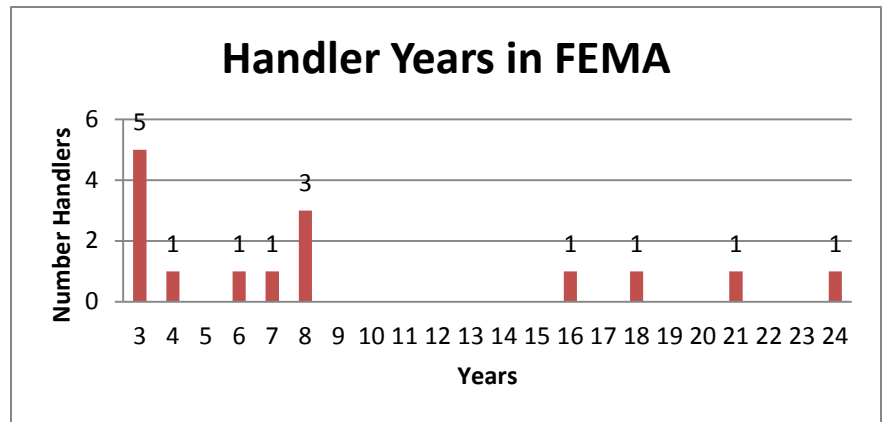- 64% (18/28) Canines were represented in the returned surveys
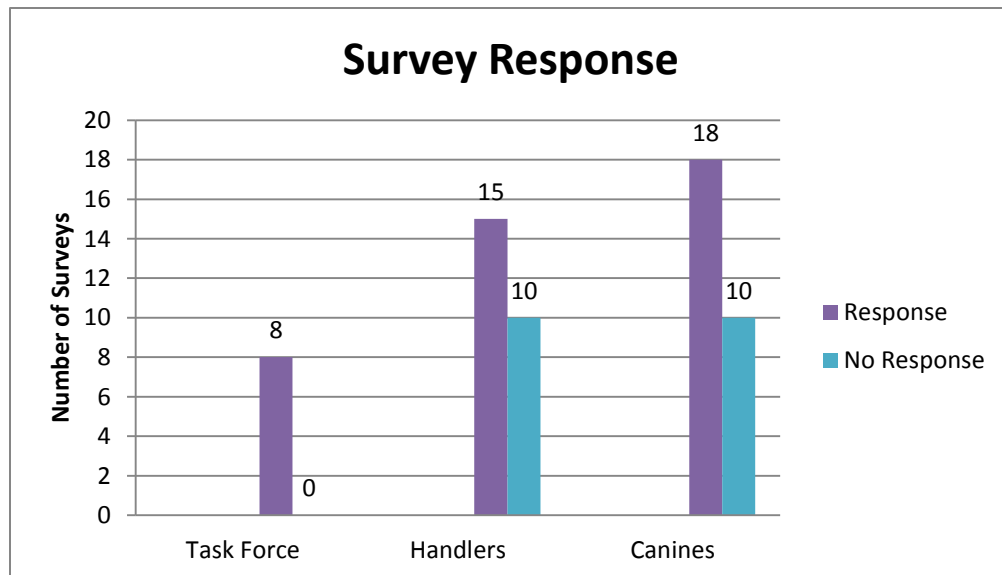
Handler Data

Surveys were received from 60% (15/25) of deployed handlers

<u>Experience</u>
These 15 handlers accrued a total of 135 years of experience in the FEMA System:
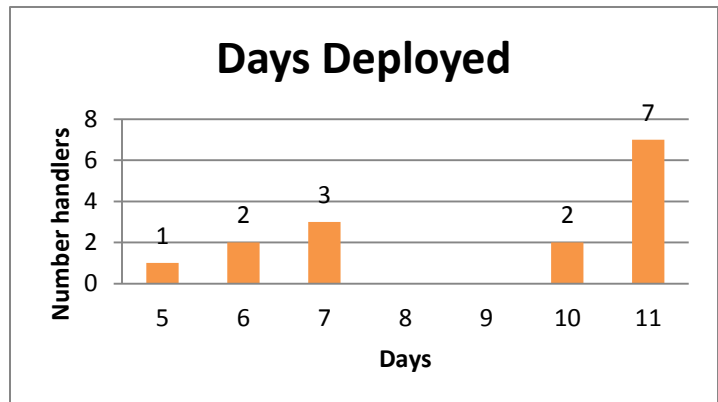
- Mean 9 years in FEMA
- Median 7 years in FEMA
- Mode 3 years in FEMA
- Range 3 to 24 years

Handler Years in FEMA
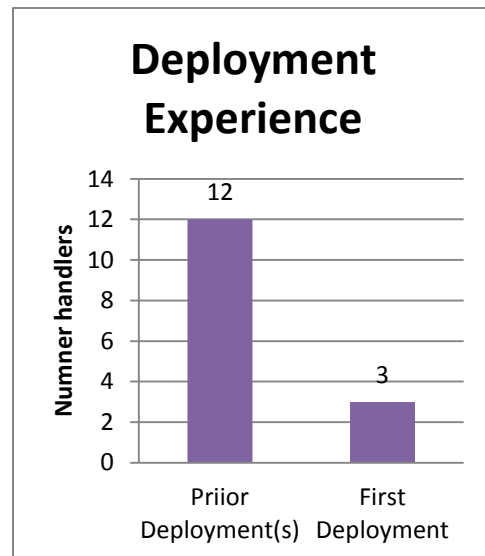

<u>Days Deployed</u>
These 15 handlers accrued a total of 135 days deployed for Hurricane Michael:

- Mean of 9 days deployed
- Median of 10 days deployed
- Mode of 11 days deployed
- Range was 5 to 11 days deployed

Days Deployed

<u>Deployment Experience</u>
- 80% (12/15) handlers deployed previously
- 20% (3/15) this was their first deployment
  - 2 had K9s also on 1st deployment

Deployment Experience

12

Breeds

Number Canines:
- Labrador Retriever: 9
- Border Collie: 2
- German Shepherd: 2
- Dutch Shepherd: 2
- Belgian Malenois: 1
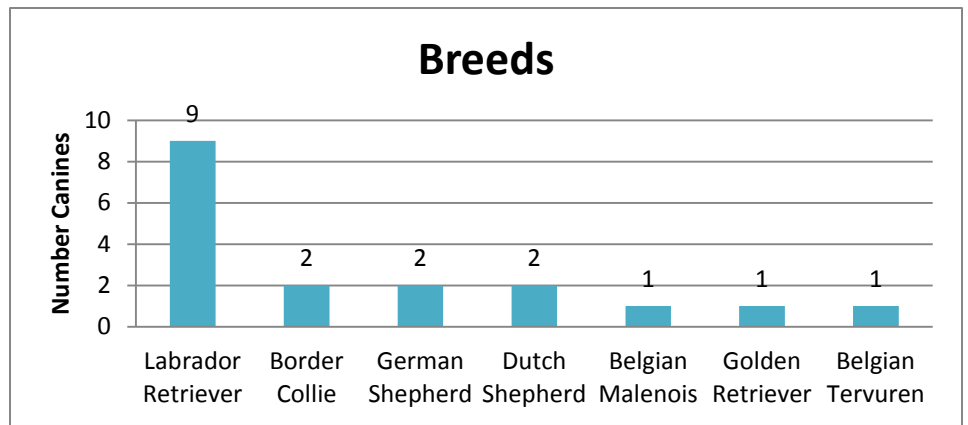- Golden Retriever: 1
- Belgian Tervuren: 1

Canine Data

Surveys were received on 64% (18/28) deployed search canines.

Breeds
- Labrador Retriever 50% (9/18)
- Border Collie   11% (2/18)
- German Shepherd   11% (2/18)
- Dutch Shepherd   11% (2/18)
- Belgian Malenois   5.5% (1/18)
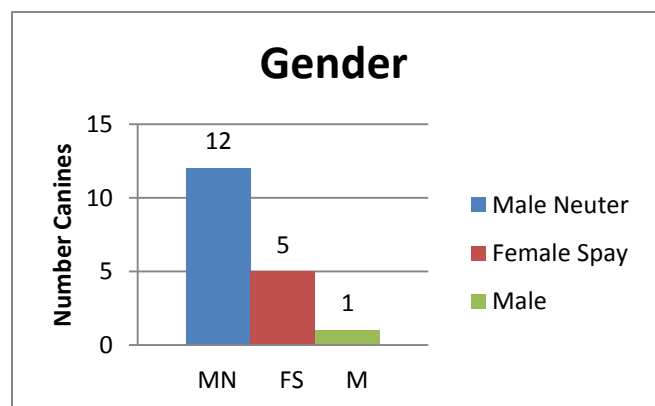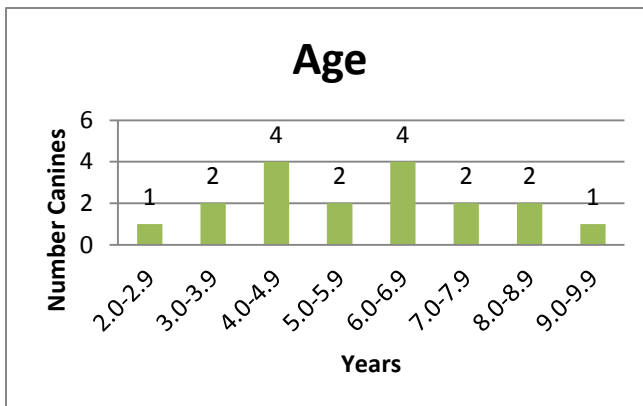- Golden Retriever   5.5% (1/18)
- Belgian Tervuren   5.5% (1/18)

Age

These 18 canines accrued a total of 1,252.75 months in age (104 years 5 months).
- Mean age 69.6 months (5 years 9.6 months)
- Median 69.5 months (5 years 9.5 months)
- Mode 72 months (6 years)
- Range 31.25 to 116 months (2 years 0.5 months to 9 years 8 months)

Gender
- 67% (12/18) male neuter (MN)
- 28% (5/18) female spay (FS)
- 5% (1/18) male intact (M)
- 0% (0/18) female intact (F)

Age

Number Canines by Years:
- 2.0-2.9: 1
- 3.0-3.9: 2
- 4.0-4.9: 4
- 5.0-5.9: 2
- 6.0-6.9: 4
- 7.0-7.9: 2
- 8.0-8.9: 2
- 9.0-9.9: 1

Gender

Number Canines:
- MN (Male Neuter): 12
- FS (Female Spay): 5
- M (Male): 1

<u>Search Certification</u>
Although the total deployed canines were equally divided at 14 LF and 14 HRD, the 18 survey canines were divided as follows:
- 56% (10/18) Human Remains Detection (HRD)
- 44% (8/18) Live Find (LF)

<u>Deployment Experience</u>
- 72% (13/18) canines had deployed previously
- 28% (5/18) this was their first deployment
  - 2 K9s were with handler on their 1st deployment

Deployment Experience

Search Certification
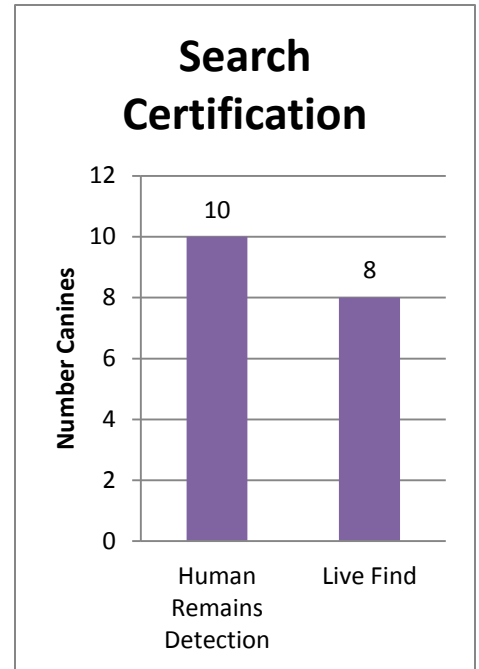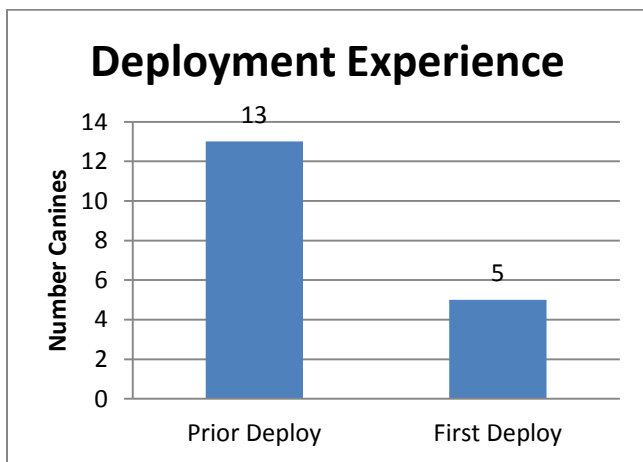
Transport

All Canine Search Team (CST) deployment mobilization transport was by ground.
All teams demobilized via ground transport as well.

- For 100% (18/18) canines there were no mobilization transport issues
- For 100% (18/18) canines there were no demobilization transport issues

Base of Operations and Staging

Task Force Bases of Operation (BoO), resting/sleeping bases, and forward staging areas were mainly located in the state of Florida, as well as Alabama and Georgia.

- Florida: Pensacola, Panama City, Mexico Beach, Calhoun City, Greenwood, Marianna, Eglin Air Force base in Valparaiso, Jackson City
- Georgia: Perry
- Alabama: Maxwell Air Force Base in Montgomery, Mobile

Forward staging area venues for 94% (17/18) of the canines during day operations included tents and air conditioned vehicles. One canine remained at a school gym. Evening base staging areas for 94% (17/18) of the canines during day operations included tents and air conditioned vehicles as well. One canine stayed in a school.

Hazmat and Safety

Weather conditions for canine search teams were generally hot and humid. A significant portion of canine search operations was located in the Mexico beach, Florida area. Temperatures generally ranged $72^oF – 89^oF$, with clear skies and full sun, light winds at 10-14 mph, zero precipitation.[13] Hyperthermia and dehydration awareness was high; these potential medical concerns highly monitored.

During the week spent with the canine searches at Mexico Beach, Florida, there were no dehydration or heat stress medical issues that occurred. Handlers were extremely aware and conscientious about adequate work-rest cycles in the heat, limiting direct sun exposure, frequent watering-down of canine bodies, and seeking shade at every opportunity.

Flood waters and marina bay water contamination concerns included unknown depths, sewage and human remains biohazards, petroleum, pesticides and fertilizers, lead and asbestos, radiation (hospital sources), and other household chemicals. Building and wide area search contamination concerns additionally included dangerous gas levels, carbon monoxide, live electrical wires, unstable items, and widow maker (unstable) trees.

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.

73% (11/15) handlers reported receiving some level of hazmat briefing during their deployment. 27% (4/15) handlers reported not receiving such briefings. It is unsure if they did not recall, or received information from a source other than a formal TF briefing, because all 4 of the handlers who answered no listed sewage and water as decontamination concern for their canines.

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). Forested areas may contain wild boars and Florida panthers.

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, no-see-um midges, bees and wasps are also endemic to the south. There are venomous spiders, including the Northern Black Widow, Brown Widow, Red Widow, Brown Recluse spider.

Debris Hazards
These were not included in the survey inquiry. Collapse structure debris hazards are well known and an assumed knowledge base for handlers. These include exposed nails, broken glass and mirrors, rebar, rotting food, wires, hot metal (exposed to sun), torn wood, and loose debris among other concerns.

What was possibly unique for handlers from colder climes was the sharp spike-like protrusion on some of the downed trees. What may not have been considered are firearms and drugs.

Of the 11 handlers who did receive hazmat information:
- 82% (9/11) weather for the day
- 82% (9/11) animal concerns
- 64% (7/11) insect concerns
- 45% (5/11) water hazards
- 27% (3/11) endemic diseases
- 9% (1/11) downed trees and wires

Top to Bottom: Plant Spikes, Wires, Rotted Food, Exposed Nails

Firearm

Wire, Sharp Metal

Broken Mirror

Decontamination

Contaminants of concern as reported by the handlers in this survey included sewage, chemicals, diesel oil, flood waters with all these and briny brackish water, dirt, sand, and tree sap.

Decontamination Stations

Of the 15 handlers who responded, only 1 did not have a canine decontamination station. The canine was not exposed to any contaminant of concern, so a station was not set up.
- 93% (14/15) handlers reported a canine decontamination station available
- 7% (1/15) did not have a station

Canines Decontaminated

Of the 17 search canines who had a decontamination station available:
- 82% (14/17) did go through canine decontamination
- 18% (3/17) did not

All were decontaminated with soap and water. The soap was either dishwashing liquid or an oatmeal dog shampoo, which is used to decrease the amount of protective skin oils lost with frequent detergent shampooing.
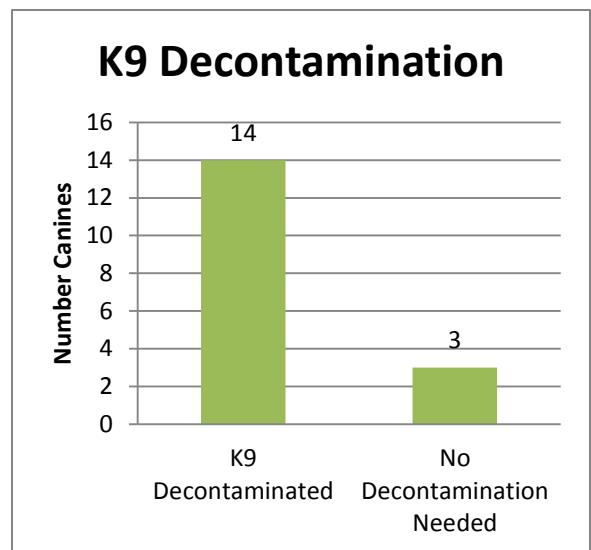
Medical and Veterinary Services

All search canines deployed for FEM receive a pre-mission veterinary examination. Once deployed, handlers and task forces are responsible for the canines' continued care. Additional options, if available, are TF veterinary team members, IST Veterinarian, deployed veterinary teams, and local veterinary hospitals.

Veterinary Services
Handlers reported their awareness of veterinary services during their deployment.
- 67% (10/15) reported the presence of veterinary service
    - 9 of these 10 handlers reported an on-site IST DVM
    - 1 handler reported an off-site veterinary team nearby
- 33% (5/15) reported unknown or unaware or no such services were available
    - 3 reported they were unaware of any veterinary services available
    - 2 of the 5 reported no services

The 3 who reported they were unaware of any veterinary services nearby were all from the same team. However, another handler with this team was aware of off-site veterinary services available.

Canine Examination
Canines receive examinations from several resources.
- 78% (14/18) canines received examinations from their handler
- 67% (12/18) canines received examinations from a TF Medic
- 50% (9/18) canines received examinations from a DVM
- 22% (4/18) canines received examinations from a TF MD
- 11% (2/18) canines received examinations from a veterinary technician
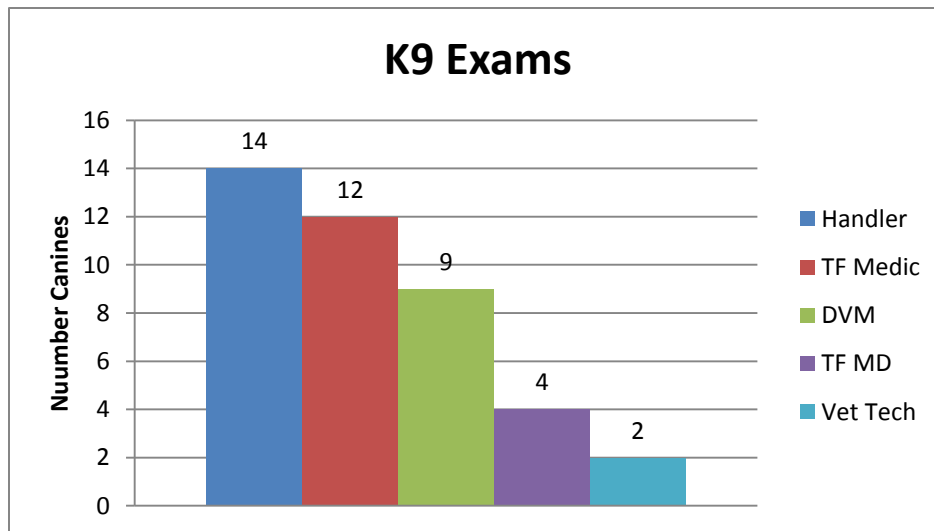
Canine Illness

The occurrence of illness to the search canines for the Hurricane Michael deployment was low. No dehydration issues were reported, despite intense heat and humidity during search operations.

- 94% (17/18) canines had no reported illness
- 6% (1/18) canine reported a decreased appetite over a 36 hour period
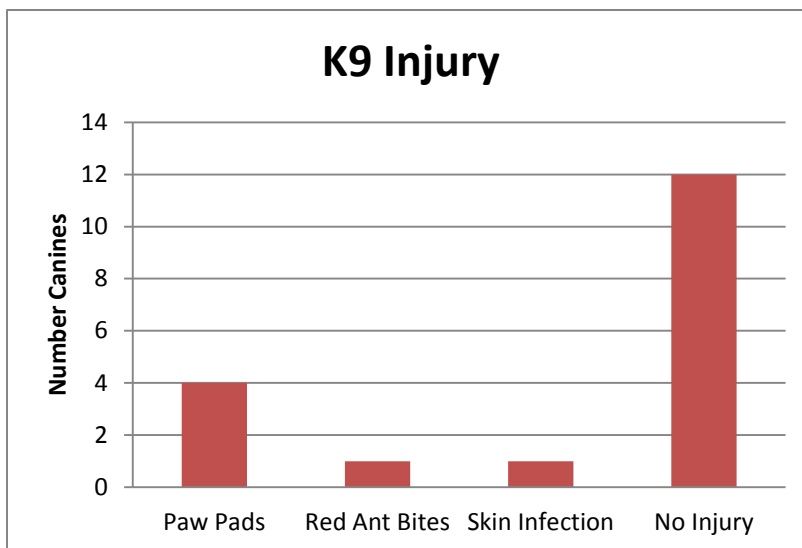
<u>Canine A</u> – 4.5 year old MN Border Collie

Canine was observed to have ingested unknown substances during search operations, did not eat all of dinner and little to no interest in breakfast the next morning – very unusual for this K9. Concerns included gastroenteritis (stomach/intestine ache), foreign body lodged in stomach and/or intestinal tract, pancreatitis (inflamed pancreas), gastric ulcer, toxin absorption. Physical examination was within normal limits, including a non-painful abdomen, no diarrhea, and good vital signs. Conservative treatment consisted of tincture of time, rest, maintain hydration (subcutaneous fluids if stops drinking water), and offer small amounts of food and treats. IF no improvement or worsening of signs, blood tests and radiographs are advised. This K9 recovered within 36 hours without further treatment.
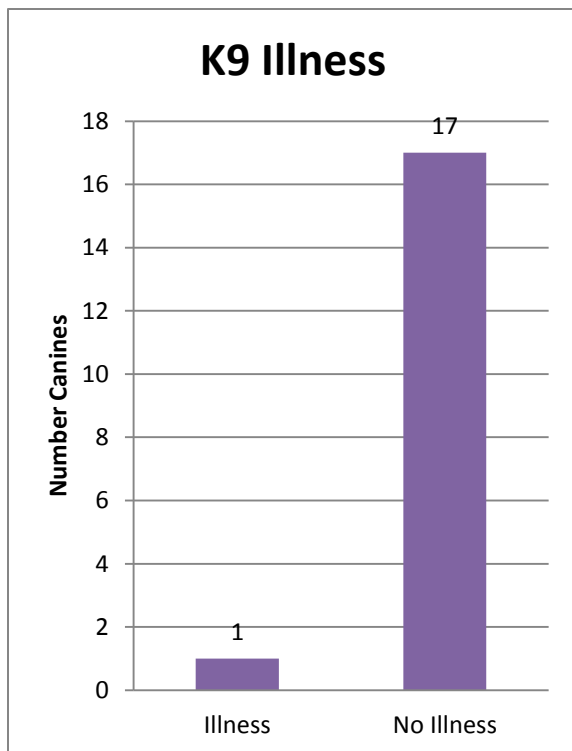
Canine Injury

The occurrence of search canine injury was moderate. Five of the six canines with injuries were all from task forces operating at Mexico Beach, Florida. The one canine operating at other locations was bitten by red ants (as was the handler).

- 67% (12/18) search canines had no reported injuries
- 33% (6/18) search canines incurred injuries, some of them had multiple issues
  - 4 K9s multiple paw pad injuries
    - 2 paw pads lacerations
    - 1 paw pads abrasions
    - 1 paw pad puncture wounds
  - 3 K9s superficial dermatitis (skin infection)
  - 1 K9 bitten by red ants

K9 Injury bar chart — Number Canines (y-axis, 0 to 14) by injury type: Paw Pads = 4, Red Ant Bites = 1, Skin Infection = 1, No Injury = 12.

<u>Canine B</u> – 7.5 year old MN Labrador Retriever
Canine was lame on front limbs after a search. Bleeding and abrasions were noted on front limb metacarpal pads, multiple digital pads, and a laceration on a hind limb digital pad. Another laceration was found on the other hind limb digital pad the next day when the paws were rechecked. All paws were soaked in an antibacterial solution, patted dry, antibacterial ointment applied, and then soft padded bandages placed. Medications included oral antibiotics, oral narcotic and anti-inflammatory pain medications. Improvement of the wounds was evident the next day, but another laceration was found on the other hind leg digital pad. All four paws were treated and bandaged. Canine was not lame when bandaged, and continued search operations. Additional bandaging material as well as duct tape placed in overlapping cross pattern was placed to protect the bandages over the debris piles. Handler reported canine was healed 3 days after demobilization.

Canine C – 6 year old MN Dutch Shepherd
Two issues occurred. Canine let out a quick cry while searching debris pile when got caught on some metal; exam normal; recheck the next day revealed a 4 mm laceration on a toe web, between 2 digits. It was cleaned, dried, glued closed, antibiotic ointment applied, and a small bandage placed to protect the area. The second issue was a 2 cm area of crusted moist skin below the left ear. Superficial allergic dermatitis was suspected; the area was cleaned and dried, with instructions to use a drying wipe and keep the area clean. The next day the laceration was checked, additional fur around the area clipped to keep it clean before bandaging again. During demobilization, the skin below the ear worsened; handler visited local clinic for oral antibiotics and allergy medicine.

Canine D – 5.5 year old FS Labrador Retriever
Canine incurred nail puncture wounds to paw pads. The wounds were bandaged and the problem resolved in 1-2 days.

Canine E – 3.5 year old FS Labrador Retriever
Canine presented with a rash-like lesions, suspected to be superficial dermatitis, on abdomen and chest areas. They were treated with decontamination (soap and water) and Pharmaseb wipes (impregnated with an antimicrobial and antifungal medication). Lesions resolved 1-2 days.

Canine F – 6 year old MN Golden Retriever
Canine developed rash-like lesions, suspected to be superficial dermatitis, on the inner aspect of the thighs; treated with Pharmaseb wipes, which are impregnated with an antimicrobial and antifungal medication. Lesions had not resolved at the time of demobilization.

Canine G – 5.5 year old FS Labrador Retriever
Canine and handler were bitten by several red ants as they swarmed up their legs. The bitten areas were washed with water and a diphenhydramine (Benadryl) spray applied. The treatment was successful, and the bite wounds resolved in a few days.

Note: I (author) was contacted about another canine, an adult MN Bull Terrier Mix, who had taken a long swim in the marina bay water at Mexico Beach. The canine developed a whole body rash and skin infection which materialized during their demobilization transport home. I researched the area for a veterinary hospital near where the task force was stopping for the night. The handler took the K9 to the clinic for evaluation and treatment. An oral antibiotic was prescribed for staph infection. The handler did not respond to the survey, so this case was not included in the formal data.

Handler Comments

<u>Weather Related</u>
- Van transport air conditioning was poor when van not moving
- My primary concern on deployment is making sure my canine will have a cool place to rest when he is not working
- Our STM did an excellent job of rotating our K9s so we didn't work them too long in the heat

<u>Decontamination</u>
- Change decontamination protocol to only use dish soap for oil; use oatmeal shampoo for decontamination baths

<u>Medical Care</u>
- Dr. Gordon took exceptional care of my canine, seeking us out to check up on him, and following up during demobilization. A post deployment follow up with the Task Force Vet finds that his pads are in the final stages of healing but are otherwise not bothering him. Deployment with the Water Rescue MRP brings some logistical issues to overcome. There was no formalized decontamination station set up but we were able to accomplish it through the use of local engine companies and a personal supply of soap. Our task force took one of our quarterly trainings to have our task force Vets put on a K9 Medical Class for the handlers and the Medical Component that paid dividends on this deployment with our medical specialist helping to change the bandages on Seamus several times.

- My canine was observed to have ingested unknown substances; ate half his dinner, and not hungry for breakfast next day; physical examination (PE) within normal limits (WNL); resolved with time. It was good to have IST DVM on site to treat K9s that needed treatment.

- IST DVM interaction with teams was assurance we had high level of care a phone call away; happy to see that you were deployed and available if we needed. I would like to see mobilization process with requirements a little more robust but understand the limitations that each task force has.

<u>Miscellaneous</u>

- Glad I have knowledge of K9 physical fitness, stretching exercises.

References

1. Gordon LE. Injuries and illnesses among urban search-and-rescue dogs deployed to Haiti following the January 12, 2010, earthquake. *J Am Vet Med Assoc* 2012;240:396-403.
2. Gordon, LE. Haiti Earthquake - Handler and Canine Deployment Survey. Submitted to the FEMA Program Office March 2011. Available upon request from the author.
3. Gordon LE. Joplin Missouri Tornado - Handler and Canine Deployment Survey. Submitted to the FEMA Program Office January 11, 2013. Available upon request from the author.
4. Gordon, LE. Hurricane Sandy - Handler and Canine Deployment Survey. Submitted to the FEMA Program Office December 27, 2012. Available upon request from the author.
5. Gordon, LE. Moore Oklahoma Tornado - Handler and Canine Deployment Survey. Submitted to the FEMA Program Office July 11, 2013. Available upon request from the author.
6. Gordon, LE. Colorado Flood - Handler and Canine Deployment Survey. Submitted to the FEMA Program Office December 4, 2013. Available upon request from the author.
7. Gordon, LE. Injuries and Illnesses among Federal Emergency Management Agency-certified search-and-recovery and search-and-rescue dogs deployed to Oso, Washington, following the March 22, 2014, State Route 530 landslide. *J Am Vet Med Assoc* 2015;247:901-908.
8. Gordon, LE. SR-530 Slide, Oso, Washington – Canine Illness and Injury Report. Submitted to the FEMA Program Office June 2014. Available upon request from the author.
9. Gordon, LE. Nepal Earthquake Search Canine Deployment Injury and Illness Report. Submitted to the FEMA Program Office April 26, 2015. Available upon request from the author.
10. Gordon, LE. 2017 Hurricane Deployment Triplet Canine Health Data Report Hurricane Harvey, Hurricane Irma, Hurricane Maria. Submitted January 2018. Available upon request from the author.
11. Gordon, LE. Hurricane Florence Canine Illness and Injury Data. Submitted November 21, 2018. Available upon request from the author.
12. https://en.wikipedia.org/wiki/Hurricane_Michael Accessed November 24, 2018.
13. https://www.wunderground.com/history/weekly/us/fl/panama-city/KECP/date/2018-10-14 Accessed November 24