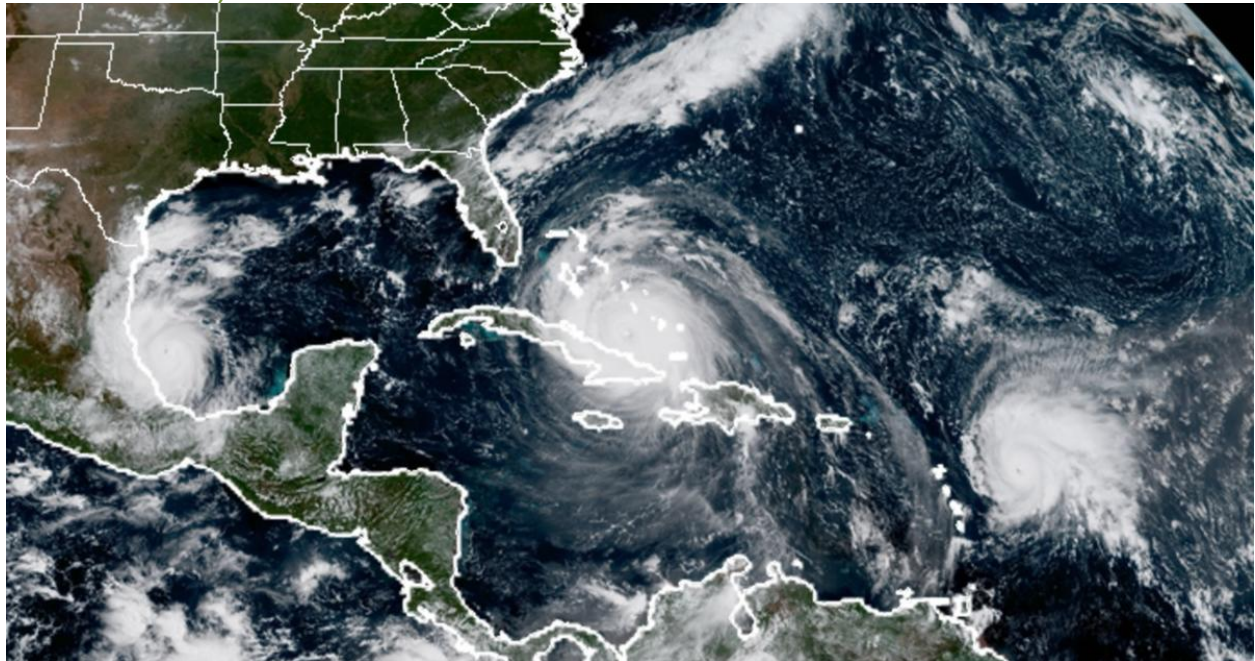


2017 HURRICANE DEPLOYMENT TRIPLET

CANINE HEALTH DATA REPORT

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HURRICANE HARVEY

HURRICANE IRMA

HURRICANE MARIA

FEMA Urban Search and Rescue deployed thousands of personnel, including over 100 search canines, to three major hurricanes during August and September of 2017, many who remained in theater over 2 or all 3 events. In addition to traditional IST and Type I team assets and HEPPs, several Type III, Type IV, and Mission Ready Packages for Water Rescue, Canine Search, and Logistics played an important role in support of local and regional rescue operations.

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Introduction

This document encompasses data from three separate hurricane deployment events due to their similar nature and close timing. Presented are the eighth, ninth, and tenth reports in a series by the author to document illness and injury incurred by FEMA US&R search canines deployed to disasters within and outside the continental United States (OCONUS). 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}, and Nepal Earthquake (2015)⁹.

The earliest publications to document search canine medical issues were the Oklahoma City Bombing (Duhaime 1998)¹⁰ and The World Trade Center and Pentagon terrorist attacks (Otto 2002, 2004, 2010¹¹⁻¹³; Slensky 2004¹⁴; Fox 2008¹⁵). Documentation of canine medical events provides data that allow the system to detect patterns, monitor trends, and discover changes in deployed canine injury and illness events. Medical training and logistical needs may then be adjusted to better fit the needs for canine medical care based on the nature of the deployment.

Real world use, for example, is demonstrated by the addition of and modifications made to FEMA US&R canine decontamination procedures and equipment. Another potential real world benefit occurred January 2018. Medical care and preventative measures for the health of search canines working the mud slides in southern California that occurred due to rains on fire-denuded hillsides can be referenced from the SR-530 Oso, Washington Landslide report^{7,8}.

Appreciation goes out to the handlers who responded to these surveys. It is with their dedication and assistance that this author can continue data collection on deployed FEMA US&R system search canines.



FEMA Response to Three Sequential Hurricanes

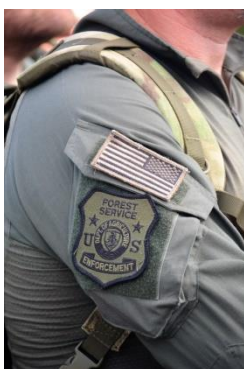
Hurricanes Harvey, Irma, and Maria occurred in close sequence during August and September of 2017. Within this relatively short period they left a swath of disaster due to wind and water from the Caribbean Sea to the Gulf of Mexico, from the Lesser Antilles through the West Indies to Florida, Louisiana, and Texas coasts. Hurricane Harvey's hardest impact area was in Texas, Hurricane Irma hit hardest in Florida, and Hurricane Maria devastated the US Virgin Islands of St. John, St. Thomas, St. Croix and Puerto Rico, plus many smaller island communities.

All 28 FEMA US&R Task Forces were deployed among these three events. In addition, realizing the need to balance aid requests without depleting local response efforts, a significant number of teams deployed as other than the traditional Type I configuration. Instead, the system deployed teams with configurations for Type III and Type IV teams; Mission Ready Packages (MRPs) with specialties in water rescue, logistics, live find canine search and human remains detection canine search, as well as seven hazardous Materials Equipment Push packages (HEPPs).

Texas US&R Teams played a significant role in the response for Hurricane Harvey as a state asset, as did Florida Teams for Hurricane Irma, and Puerto Rico Search & Rescue was actively engaged in operations for Hurricanes Irma and Maria in their home territory. Five FEMA US&R Canine Search Teams deployed to both Hurricane Harvey and Irma while 4 others deployed to both Hurricane Irma and Maria.

Response efforts faced air support challenges for operating outside the continental United States (OCONUS) due to the wide-spread and large-scale deployment of several government agencies. Efforts to engage combinations of military, charter, private, and commercial air craft met with various successes and failures.

Forced protection played a major role during operations in all three deployments, both within the contiguous United States and on US and territorial islands. To the author's knowledge no confrontational incidents were reported, however individual accounts reveal teams were met with armed residents on several occasions and looting was reported in many areas.



Survey Collection

Surveys¹⁶⁻¹⁸ were sent electronically to the FEMA System Canine Coordinators for each team, as well as additional individual handlers whose electronic mailing addresses were available. Personal data is not shared, and all personal information is confidential.

Survey data included handler years with team, handler and canine first deployment experience, days deployed, transport medical issues, canine signalment (breed, age, sex), live find or human remains detection, staging areas, Hazmat briefings, decontamination, illness and/or injury events, veterinary and/or other medical support, and additional comments.

Definitions for reference:

Mean = average; values are added and then divided by total number of values

Median = middle value in the list of numbers

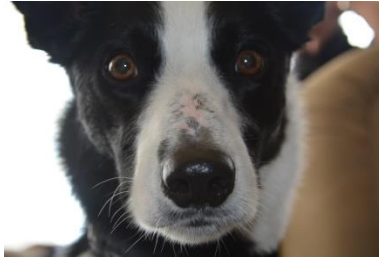
Mode = value that occurs most often; if no number is repeated, there is no mode

Range = the span between the largest and smallest values



Executive Summary

Survey Response



Comments

The FEMA US&R Handler response to the Harvey, Irma, and Maria canine illness and injury surveys was estimated at 36%, 33% and 58% respectively. Estimated, not known, because a definitive count of handlers deployed to these events could not be obtained. These are the lowest response rates of all prior surveys to date. Previous percentages include Haiti 58%, Sandy 73%, Moore 88%, Colorado 92%, Oso 96%, and Nepal 100%.

According to Survey Gizmo¹⁹, internal surveys will generally receive a 30-40% response rate or more on average, compared to an average 10-15% response rate for external surveys. Response rates can soar past 85% when the respondent population is motivated and the survey is well-executed. Despite efforts to create the perfect survey, there are inherent errors that cannot be avoided. Some response information relies on the subjective nature of human memory, perception, and recollection unsubstantiated by objective facts.

Methods to improve data accuracy include acquiring daily 214 Unit Logs, medical records, timely distribution of the survey, modifying length, questions, design, and ease of responding.

Difficulties for these 3 hurricane survey returns include inability to obtain a list of handlers deployed, reliance on other system members to distribute survey versus having handler contact information directly, time of year (holiday season), and perception by system members that if a canine did not engage in missions then the survey is not needed or important. On the contrary, all aspects from activation to demobilization, including transport issues, weather-related concerns, endemic diseases, and accidents are important factors in canine health during deployment with or without active operational engagement.

Recommendations

- (1) An avenue (contact person, Program Office) to acquire the list of deployed canine handlers to a disaster would be extremely helpful. Because this is a voluntary survey and there is no mandatory record keeping or requirement for reporting canine illness and injury, this information will increase the potential for better response and therefore more accurate information. Names and contacts are never published or shared within or outside the system.
- (2) Creation of a standardized FEMA US&R post-deployment search canine illness and injury documentation form for every handler to fill out and submit as a requirement for their deployment.

Team Deployment Configurations

Comments

Type I Teams carry a complete cache compliment, including canine search equipment and canine medical supplies. Type III Teams, Type IV Teams, and Mission Ready Packages do not carry a full cache, and are reliant at times on the support from a co-deployed Type I Team without depleting their ability to support their own team. The Logistics MRP was an outstanding addition to the compliment of multiple team configurations, providing support that allowed these teams to safely and effectively operate in theater.

Recommendation

- (1) Peer review of Type II, Type IV, and MRPs and additional instructive sessions on the various configurations and how they operate may increase familiarity to a system that so far has had few opportunities to work in this manner with each other. Real world deployments (Oso Landslide, Hurricane Matthew) and now Harvey, Irma, and Maria are a valuable asset to use in this instruction.
- (2) Cooperative sharing of information, planning, and search canine resources among teams is recommended to best utilize deployed resources. Integration of Type III, Type IV, and MRP personnel is needed.

Handler Data

Comments

Handlers at all 3 hurricanes ranged in Task Force experience from new (1, 1.5, and 1.5 years Harvey, Irma, Maria respectively) to experienced (20, 20, and 24 years respectively). The diversity of experience and mentoring of newer team members through all phases of a deployment is a high-value model in our system.

The decrease in first-time deployments (60%, 28%, and 11% respectively) and increase in previously deployed handlers (40%, 72%, and 89% respectively) with each successive hurricane is not unexpected, since several handlers deployed for more than one hurricane during this time.

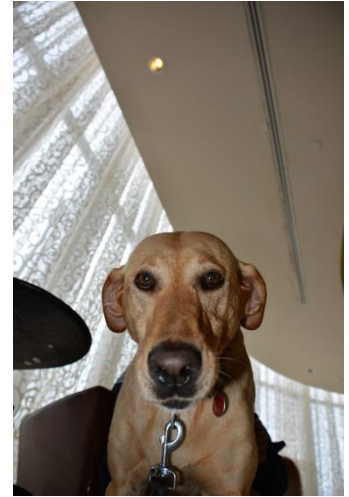


Canine Data

Comments

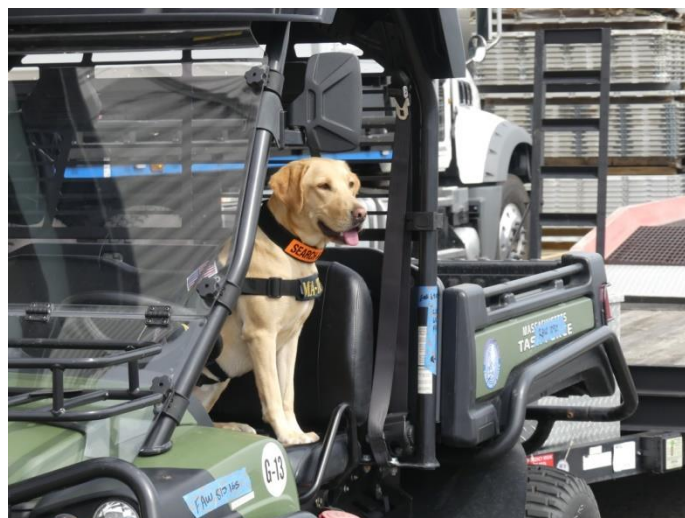
Search canine ages ranging from young (2.5-3 years) to mature (10-11 years) for all 3 deployments reflects how system's handlers recognize the need to constantly train new canines as others age out. It takes 2.5-3 years of training for a canine to achieve the level of search capability required by FEMA US&R. This is a long, costly, demanding regimen that reflects in the level of expertise revealed during search operations.

Male neuter Labrador Retrievers remain the prominent certified search canine in the system, however for Hurricane Irma spayed female Labradors numbered higher. This is no reflection on the abilities of other breeds. Each canine is subjected to the same certification testing, and each brings their own talents to the deployment. Intact females do present a challenge should they come into estrus ('heat') and handlers awareness of their canine's cycles are an important aspect of responsible deployment.



Live Find (LF) purpose canines were the majority of deployed at 69%, 81%, and 95% respectively, however the deployment of Human Remains Detection (HRD) canines is now well established in the FEMA US&R System. Both fill a need depending on the type of requested aid and the nature of the disaster. Several handlers deployed with 2 search canines, one LF and one HRD, allowing for changes in search purpose in a timely manner. The logistics of one handler caring for 2 canines was accomplished with the help of other team members, a cooperative effort on all sides.

Similarly to handlers, the decrease in first-time deployments for the canines (81%, 46%, and 26% respectively) and increase in previously deployed canines (19%, 64%, and 74% respectively) with each successive hurricane is not unexpected, since several canines deployed for more than one hurricane during this time.



Mobilization and Demobilization

Comments

Zero mobilization transportation issues were reported for the 61 survey-reported canines (16, 26, and 19 canines for Harvey, Irma, and Maria respectively).

One demobilization transportation medical incidence was reported, a minor wound incurred by a canine during demobilization for Hurricane Irma. The other 2 issues were non-medical, during demobilization from Hurricane Maria, involving charter aircraft company policies regarding canines: all canines must be muzzled for boarding, a policy instituted for military canine transport; one handler reported the charter company tried to deny the boarding of so many canines.

Transportation safety is one of many safety parameters during a deployment, and this was met with great success for all 3 hurricanes. Policy issues for aircraft companies unaccustomed to transportation of search canines may benefit from Memorandums of Understanding, although the sheer number of companies across the country may be daunting. Issues of transport availability are not the focus of this report.

The issues here are considered minor, and no recommendations presented at this time.



Operations

Comments

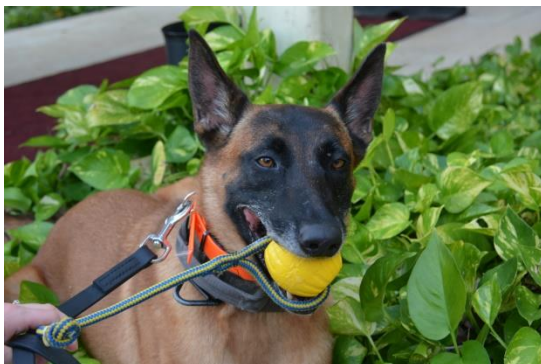
Missions for search canines varied widely, depending on the location, situation, and aid request. When dealing with multiple federal, state, and local agencies a situation may change several times during an operational period. Search operations for canine were, subjectively, few. Long periods of inactivity were experienced. Canines (and their handlers) may become frustrated with the lack of activity, but were always ready when needed.

Two solutions were observed by the author when staged in Puerto Rico for Hurricanes Irma and Maria. First, by setting up mock searches and doing some training (as weather allowed) the attitudes and demeanor of the canines were greatly improved. Second, engagement in good will missions on islands off the coast of Puerto Rico as well as during missions around the island allowed for handlers and canines to engage in positive activities that were appreciated by the populace. Recognition by the IST members for the need to engage Canine Search Teams in some form of helpful activity benefited not only the citizens of Puerto Rico, but also handlers and canines – a win-win.

Briefings in relation to canine concerns vary in their content, but generally should include weather, hazmat concerns (especially as to how they can contaminate and affect canines), endemic diseases, and local wildlife and insect populations. Handlers reported a variety of subjects they heard, and not all received the same information. Many handlers share information informally and receive team briefings in addition to IST briefings. One of the challenges was the wide separation geographically of many handlers. And although much information is contained in the IAP, subjectively most handlers do not receive this document.

Recommendations

A canine-specific debriefing to handlers, Search Team Managers, and medical personnel, when possible, may impart search canine concerns in a more precise and complete manner. In addition this would provide a venue for the sharing of additional information from personnel who have been engaged in operations.



Decontamination

Comments

Canine decontamination is a recognized part of FEMA US&R canine care²⁰ and has become part of the expected set-up to maintain a clean Base of Operations environment as well as serve to decrease potential harmful contaminant to the canines. Many inventive ideas occur in order to keep canines away from standing in contaminated decontamination water and use low-flow pressure systems. In Puerto Rico there were overturned cartons lashed together over a drain, baby shampoo and/or dishwashing soap, and low pressure spray hose.

One handler reported the use of diluted Simple Green™, a product approved for use on inert surfaces but not directly on animals. Based on decontamination trials under the direction of Dr. Erin Perry²¹, Simple Green™ was not effective on oil-based contamination of nylon, leather, and biothane equipment. There are serious concerns regarding dermal health with repeated exposure to this product, and no evidence to date of its effectiveness on microbiological contaminants. Simple Green™ is not approved for use on animal tissue. Therefore this product cannot be recommended for use as a canine decontamination solution. Unless an antidotal solution is required for a specific contaminant, soap and water are the mainstays of canine decontamination.

Recommendations

Distribution of a FEMA US&R policy stating the discontinuation of Simple Green™ as a canine decontamination solution, until scientific review can be performed and evaluated by Hazmat, medical, and veterinary personnel.



Medical Care

Comments

Handlers perform medical checks on their canines as part of their canine care (100%, 92%, and 89% for Hurricanes Harvey, Irma, and Maria respectively). Additional resources included Task Force doctors, medics, and veterinary technicians. Two deployed TFs had veterinarians deployed as well.

On site and off site local hospitals were available in varying degrees. Texas A&M University has a robust veterinary search canine support system, including staffing and mobile hospital facility, and deployed for Hurricane Harvey. Veterinarians were deployed with their Task Force for Hurricane Irma, one in Florida and one in Puerto Rico. An IST Veterinary Officer was deployed for Hurricane Maria, and off-site 24-hour care veterinary hospital in Puerto Rico was visited and confirmed as a primary care facility.

Establishing veterinary advanced care options and including this information in the IAP is standard and was available. Handlers reported veterinary services available (87%, 76%, and 100% for Hurricanes Harvey, Irma, and Maria respectively), however some were unaware or were staged and had no need for these services.



Canine Illness and Injury

Comments

No illness was reported for 81%, 85%, and 95% for Hurricanes Harvey, Irma, and Maria respectively. Seven of the 8 reported illnesses from all 3 deployments were minor and all resolved during their deployment. One canine was more seriously ill; the handler and canine were demobilized for further diagnostics and treatment.

No injuries were reported for 81%, 88%, and 95% for Hurricanes Harvey, Irma, and Maria respectively. Six of the 7 reported injuries were minor and all resolved during or soon after their deployment. One canine had a potentially more serious injury, but was demobilizing the next day and was cared for until further evaluation could be performed back home.

Of some note is the lack of any dehydration or other heat-related issues, considering the heat and humidity in the areas of deployments. These issues have been more prevalent in past survey data (Haiti Earthquake^{1,2}, WTC¹¹⁻¹⁵, Joplin Tornado³, Moore OK⁵, Colorado Floods⁶, Oso Landslide^{7,8}). Reasons may be the decrease use of canines for missions, staging of canines in air-conditioned buildings and vehicles, increased awareness of these issues and better prevention methods. These may also apply to the few injuries that were reported.



Handler Comments

Comments

Veterinary Services

Overall comments of appreciation for veterinary services that were available for all deployments were noted by many handlers. The FEMA US&R System efforts to provide for canine medical care are exemplary. When these are unavailable, others handle canine care admirably.

Comments of Concern

Decontamination with Simple Green™

There are serious concerns regarding dermal health with repeated exposure to this product, and no evidence to date of its effectiveness on microbiological contaminants. ***Simple Green™ is not approved for use on animal tissue. Therefore this product cannot be recommended for use as a canine decontamination solution. Some of their products are more toxic than others.***



Distribution of a FEMA US&R policy stating the discontinuation of Simple Green™ as a canine decontamination solution, until scientific review can be performed and evaluated by Hazmat, medical, and veterinary personnel is highly recommended.

Heartworm Preventative

One handler stated that not all of the handlers knew about heart worm preventative because we are in California and it isn't much of a concern here. Heartworm disease does occur in California, as it does in most of the United States²³. All system canines are recommended to be on flea, tick, and heartworm preventative. Alternatively, products for these conditions should be included in the cache, preferably administered before mobilization especially if deploying to an area where these conditions are prevalent (which is everywhere).



Mission Ready Packages

Uncertainty regarding interaction with other Task Forces, roles and responsibilities, access to information and logistical supplies are among some of the concerns related by handlers in the surveys as well as during deployments.

As a system we are embarking on new configurations and climate-changing events for which future discussion and conversations will help disseminate information and ideas on how to improve. Continuing education meetings and after action reports are ways to disseminate experiences, issues, evaluate and discuss new ideas, and modify protocols.

Hurricane Harvey

Storm Track

The remnants of Tropical Storm Harvey that formed on August 17, 2017 east of the Lesser Antilles continued to push northwest for several days and eventually crossed Mexico's Yucatan Peninsula. Once its remnants moved back over water in the southwest Gulf of Mexico, Harvey quickly reformed into a tropical depression on August 23. In 56 hours Harvey grew from a regenerated tropical depression over the Gulf of Mexico into a Category 4 hurricane, with maximum sustained winds of 130 mph, as it made landfall near the Texas Gulf Coast late on August near Rockport, Texas. The hurricane had a diameter of 280 miles. Harvey's center of circulation stalled over south Texas. This slow movement from Aug. 26-30 led to catastrophic flooding that was observed in southeast Texas, producing 51 inches of rain in parts of Texas and storm surge flooding along portions of southern and eastern Texas and western Louisiana. It then meandered slowly east into the Gulf of Mexico before making a final landfall near Cameron, Louisiana, on August 30 when it was downgraded to a tropical storm²⁴.

Deployed Resources

System resources were activated at the request of the State of Texas, FEMA Region VI, and FEMA HQ to assist the Texas response effort. The Blue Incident Support Team (IST), six type 1 task forces (AZ-TF1, CA-TF1, CA-TF4, NE-TF1, NY-TF1, TN-TF1), eight type 3 task forces (CA-TF5, CA-TF8, CO-TF1, FL-TF1, MO-TF1, OH-TF1, PA-TF1, UT-TF1), 13 Water Rescue Mission Ready Packages (CA-TF2, CA-TF3, CA-TF6, CA-TF7, FL-TF2, IN-TF1, MA-TF1, MD-TF1, NJ-TF1, NV-TF1, VA-TF1, VA-TF2, WA-TF1), and 7 HEPPs were operational in College Station, Texas and deployed as needed for operations. TX-TF 1 deployed as a state asset²⁴.

Survey Data

Survey Response

Estimation of deployed canines was performed as a definitive accounting could not be attained.

The following formula was used: 6 Type I teams @ 4 canines per team = 24

 8 Type III teams @ 2 canines per team = 16

 TX TF1 Type I state asset @ 4 canines = 4

Estimated deployed canine total = 44

Surveys received were 16 (36%) from 15 handlers (34%). One handler deployed with 2 canines.

Handler Data

For the 15 handlers who completed the survey:

- Years on Task Force ranged from 1 to 20 years, with a mean of 7.3 years, median of 5 years
- It was a first deployment for 60% (9/15) of handlers while 40% (6/15) previously deployed
 - Note: 5 handlers had deployed to Hurricane Harvey, demobilized, and redeployed for Hurricane Irma

Canine Data

For the 16 Canines whose handler completed the survey:

- Ages ranged from 3 years 1 month to 11 years 3 months, with a mean of 5 years 8 months, median of 4 years 10 months, and mode 4 years 6 months
- Male neuter 62.5% (10/16), male 18.75% (3/16), and female spay 18.75% (3/16)
- Labrador Retrievers 56.25% (9/16), Labrador mix 18.75% (3/16), Belgian Malinois 12.5% (2/16), and one each of a German Shorthair Pointer and a Boxer mix 6.25% (1/16)
- Live Find comprised 68.75% (11/16) and Human Remains Detection 31.25% (5/16)
- It was first deployment for 81.25% (13/16) while 18.75% (3/16) had prior deployment

Mobilization and Demobilization Data

- All but one handler (93%, 14/15) deployed via ground transport along with 100% (16/16) of the canines; the one handler that deployed to replace the injured handler traveled via commercial aircraft to take the place of an injured handler
- Demobilization for the Canine Search teams (one handler with 2 canines) was via ground transport for 73% (11/15), commercial aircraft 20% (3/15), both ground and commercial air for 7% (1/15)
- All handlers reported no transportation issues occurred for any canine (100%, 16/16)

Operations

- Days deployed ranged from 1 to 15 days, mean 11.3 days, median 13 days, mode 14 days. One handler had deployed for 8 days but was injured and demobilized, so another Task Force team handler replaced him to work with the same canine, but was demobilized a day later.
- All canine search teams were stationed in Texas, including Rosenberg, Katy, San Antonio, El Paso, College Station, Robbstown, and Houston
- Teams staged both day and night in a variety of venues, including schools (gymnasiums and classrooms), hotels, airport terminal, warehouse, fairgrounds, armory, arena, vehicles and outside on the ground
- Briefings received by 14 handlers (Handler there for one day was not counted) included weather (100%, 14/14), flood waters (100%, 14/14), local insects and animals (93%, 13/14), endemic diseases (57%, 8/14), and chemical fumes/Hazmat (14%, 2/14)

Decontamination

- Decontamination station was present at areas where 73% (11/15) of the canine search teams (one handler with 2 canines) canines were staging; none for 27% (4/15)
- Decontamination was performed on 68.75% (11/16) search canines
- Soap and water was used at all stations; one had water only and/or soap and water used
- Contaminants of concern included flood waters, mud, insulation, one used it as a preventative

Medical Care

- 100% (15/15) handlers performed examinations on their canines; 27% (4/15) reported they were the only ones doing these medical checks
- 73% (11/15) reported exams performed by other personnel: veterinarian for 53% (8/15), veterinary technician for 40% (6/15), Task Force MD for 27% (4/15), Task Force Medic for 13% (2/15)
- Veterinary services on site and off were reported by 87% (13/15) handlers, and were identified as either from an unknown veterinary team, IST, TEEX, TAMU, TX TF1, or TAMU Veterinary Emergency Response Team

Canine Illness

- No illness was reported for 81.25% (13/16) search canines
- Illness occurred in 18.75% (3/16) of the canines: one vomiting, one skin rash, one minor problem but handler could not recall the details. All were treated and the issues resolved during their deployment

Canine Injury

- No injuries were reported for 81.25% (13/16) search canines
- Injury occurred in 18.75% (3/16) of the canines: one fire ant bites, one paw pad blisters, and one a bruised and cut paw. All were treated and the issues resolved during the deployment, although the fire ant bites continued healing after demobilizing.

Handler Comments

- Rental van not designed for work K9s; very hot, muggy; poorly not accommodated 5 kennels
- Hot weather was managed by keeping K9s in air conditioned van. There was limited opportunity to actually work dogs. K9s were a great source of stress relief for other Task Force members; lots of play time with tug toys
- I would have liked to have had a mission. Everything went well.
- Overall the deployment went well. I would prefer when we are traveling by vehicle that the canines be in crates that are secured in vehicles instead of riding unsecured on the seat next to the handler. On the hurricane Harvey deployment there was really no work for the dogs so we had a lot of down time. Looking back, I should have asked the boat teams if we could have ridden along with them on their missions for the experience. There was no fast moving water so it would have been very safe for the dogs.
- Having the Texas A&M Veterinary Team was a huge asset. They were able to perform exams on dogs after working and answer any questions. They worked great with me and my K9, helped us become successful on our first deployment. Huge thank you to all emergency veterinarians!!!
- I was very happy with the support provided for the canine response.
- It was nice to have a veterinary group there in the base. They did a pre-check and a follow-up and kept pretty good track of the dogs.
- Love having TEEX staff and their equipment there. They're great to work with and provide good care and follow up.

Hurricane Irma

Storm Track

Hurricane Irma lasted as a hurricane from August 31 until September 11, 2017. The storm spanned 650 miles from east to west, affected at least nine US states. On September 6, Hurricane Irma left a string of small Caribbean islands devastated. The eye of the hurricane passed over Barbuda, damaging about 95% of the buildings on the island. The hurricane hit southwest Florida on September 10, battering the state's lower half and leaving a trail of tornadoes and storm-surge flooding as its core slowly moved inland. The storm triggered evacuation orders for 5.6 million people before it made two landfalls. On Monday, Irma was downgraded to a tropical storm as it lumbered through Georgia to parts north. By Tuesday, Irma had left a trail of deadly devastation throughout the Southeast, flooding major cities including Jacksonville, Florida, and Charleston, South Carolina, and leaving millions without power.

To assist with the Puerto Rico and U.S. Virgin Island (USVI) response efforts the Red Incident Support Team (IST) was deployed CONUS, and an IST-Advance element, VA-TF2 (NIMS type 3 US&R task force, augmented with additional personnel); VA-TF1 & NY-TF1 (NIMS type 1 task forces); and five Mission Ready Packages are operational in Puerto Rico and the USVI. At the request of Region IV, and in anticipation of potential requests for Federal ESF #9 assistance, twelve NIMS type 1 US&R task forces (TN-TF1, AZ-TF1, CA-TF4, CA-TF1, PA-TF1, CO-TF1, CA-TF8, NE-TF1, CA-TF3, NJ-TF1, NV-TF1, and WA-TF1); and three Hazardous Materials Equipment Push Packages (MD-TF1, IN-TF1 & CO-TF1) were activated. Total US&R resources as of September 13, 2017 were at 1,352 personnel.

Survey Data

Survey Response

Estimation of deployed canines was performed as a definitive accounting could not be attained.

The following formula was used: 15 Type I @ 4 canines per team = 60

3 K9 MRPs @ 4 canines per team = 12

State assets FL-TF1 (2 K9s) and FL-TF2 (5 K9s) = 7

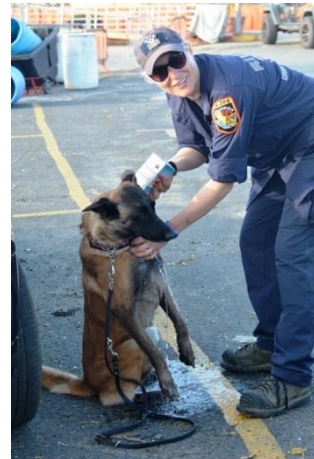
Estimated deployed canine total = 79

Surveys received were 26 (33%) from 25 handlers (32%). One handler deployed with 2 canines.

Handler Data

For the 25 handlers who completed the survey:

- Years on Task Force ranged from 1.5 to 20 years, with a mean of 9.4 years, median of 10 years, and mode of 10 years
- It was a first deployment for 28% (7/25) handlers while 72% (18/25) had previously deployed



Canine Data

For the 26 Canines whose 25 handlers completed the survey(s):

- Ages ranged from 3 years 0 month to 11 years 4 months, with a mean of 6 years 3 months, median of 5 years 11 months (there was no mode)
- Female spay 46% (12/26), male neuter 42% (11/26), male 8% (2/26), and female 4% (1/26)
- Labrador Retrievers 61.5% (16/26), Belgian Malinois 19% (5/26), German Shepherd 8% (2/26), and 4% (1/26) each Dutch Shepherd, Labrador mix, Boxer mix
- Live Find comprised 81% (21/26) and Human Remains Detection 19% (5/26)
- It was first deployment for 46% (11/26) while 54% (14/26) had prior deployment

Mobilization and Demobilization Data

- Mobilization for the 25 Canine Search Teams (one handler with 2 canines, 26 total canine) was via ground 54% (14/26), commercial air 15% (4/26,) ground and commercial air 15% (4/26), ground and military air 15% (4/26)
- All handlers (100%, 25/25) reported no transportation medical issues occurred for any canine (100%, 26/26) during mobilization. One handler reported their canine did not enjoy the vehicle transport; specifics were not available.
- Demobilization for 21 of the 25 Canine Search Teams (one handler with 2 canines, 22 canines) was via ground transport for 45% (10/22), commercial aircraft 27% (6/22), ground and commercial air for 23% (5/22), and charter for 5% (1/22)
 - *Note: 4 handlers remained in Puerto Rico, transferring from Hurricane Irma to Hurricane Maria and were demobilized from operations for Hurricane Maria. They were not included in demobilization data*
- 20 of 21 handlers that demobilized (95%, one handler with 2 canines, 22 canines) reported no transportation medical issues occurred for their 21 canines (95%, 21/22 canines)
- One handler (5%, 1/21) reported a canine injury during transport (5%, 1/22) when a puncture wound was incurred on a limb.

Operations

- Days deployed for Canine Search Teams (one handler with 2 canines) ranged from 5 to 17 days, mean 11 days, median 12 days, mode 7 days.
- 56% (14/25) Canine search teams, one handler with 2 canines, were stationed in the continental US including Georgia, Louisiana, Alabama, and Florida; 44% (11/25) were staged outside the continental US (OCONUS) in Puerto Rico, St. Croix, St. Thomas and St. John
- Teams staged both day and night in a variety of venues, including hotel, hangar, school, arena, vehicle, ground, convention center, scout camp, patio
- Briefings received by 22 of the 24 handlers (one no answer, one no specifics) included weather (86%, 19/22), flood waters (45%, 10/22), local insects and animals (73%, 16/22), endemic diseases (55%, 12/22)

Decontamination

- Decontamination station was present at areas where 62% (16/26) of the canine search teams (one handler with 2 canines) canines were staging; no station was present for 38% (10/26)
- Decontamination was performed on all canines where a decontamination station was present (100%, 16/16 search canines)
- Soap and water was used for 94% of the canines(15/16); Simple Green™ was used on 7% (1 canine)
- Contaminants of concern included flood waters, ocean water, oil, grease, and mud

Medical Care

- 92% (23/25) handlers performed examinations on their 26 canines (88%, 23/26); 56% (14/25) reported they were the only ones doing these medical checks (one handler is also a veterinarian)
- 38% (10/26) reported exams performed by other personnel: veterinarian for 19% (5/26), Task Force MD for 15% (4/26), Task Force Medic for 8% (2/26)
- No veterinary services were reported by 24% (6/26) handlers; veterinary services available included off site local hospital and 2 on site Task Force member DVMS – one from FL TF1 staged in Florida and one from MA TF1 staged in Puerto Rico.

Canine Illness

- No illness was reported for 85% (22/26) of search canines
- Illness occurred in 15% (4/26) of the canines: 3 had diarrhea and treatment resolved the issue during deployment; one had skin irritation and sores which were not treated (seen by TF Medic, no veterinary exam) and did not resolve until after the deployment
- Of Note: the one intact female canine went into estrus ('heat') during the deployment

Canine Injury

- No injuries were reported for 88% (23/26) search canines
- Injury occurred in 12% (3/26) of the canines: one had a puncture on a limb (treated, resolved during deployment), one had digital paw pad lesions on 2 limbs (treated, resolved after deployment), and one had split paw pad that resolved on its own.



Handler Comments

- Hot weather was managed by keeping K9s in AC van. Limited opportunity to actually work dogs. Lots of down time for K9s has to be managed, especially for high energy breeds like Mals. K9s were a great source of stress relief for other Task Force members. Lots of play time with tug toys
- Better access to a vet would be helpful
- When we got our health certificates I requested all of our dogs get some basic meds to take with us knowing there may not be access to a vet. I used Flagyl for diarrhea. We also treated all the dogs with Revolution. I was really glad I got our local vet to give us some basic meds before leaving home. All of the dogs in our MRP used at least the Flagyl. Also, not all of our handlers knew about heart worm preventative because we are in California and it isn't much of a concern here. As an MRP we did not know to connect with other task forces for medical needs for us or the canines. Lori is fabulous and introduced herself and was a great mentor.
- IST and TF Leaders continue to need a better understanding of K9 capabilities and how to effectively and efficiently use us as an asset.
- I always have my dog checked by my Vet before and after deployment and he is always available to me by phone if needed. I asked the hazmat guys to set up decon for the dogs. I also brought soap and water to do it myself. I was familiar to the area but so knew what hazards to be aware of but still we should have gone over that. We did go over the downed power lines and walking through flood waters.
- I was very pleased with the services provided and offered. Note: soft stool during air travel stress - Benadryl orally worked great to calm her and resolve issue.
- My Canine did not receive pre-deployment exam. Deployment movement started and moved very quickly. I was not advised prior to nor did I have time to get an exam prior to arriving at the cache. I thought I would be able to get one there, but did not. Pad split - no blood, pain, discharge, lameness.
- Some canines had difficulty with the change in environment which resulted in loose stools and stress. Part of a pre deployment checklist for canines should be asked about these situations and perhaps some travel meds can be incorporated into the veterinary cache.
- I thought mobilization and demobilization went smooth. We had a lot of down time and we utilized some of that with training which was great.
- I appreciated the deployment and the opportunity to work. Transportation was always an issue and created a lot of inability to work. There were lots of folks itching for missions but no way to transport much of the time. It seemed to take quite a while to get any work orders as well.
- Able to have crates at all times was very good. This has not always happened in the past. I feel much safer when I have a safe secure place for my K9. Charter company tried to deny the large number of k9s on flight
- Transportation to affected areas seemed always to be an issue, waiting on military or civilian airframes.
- Would have been helpful to receive some information on local concerns as related to canine health. i.e. additional immunizations recommended, local hazards (fire ants) etc.

Hurricane Maria

Storm Track

Maria became a tropical storm on September 16, east of the Lesser Antilles. The hurricane reached Category 5 strength on September 18, 2017 just before making landfall on Dominica, becoming the first Category 5 hurricane on record to strike the island. After weakening slightly due to crossing Dominica, Maria achieved its peak intensity over the eastern Caribbean with maximum sustained winds of 175 mph (280 km/h) making it the tenth-most intense Atlantic hurricane on record. On September 20, an eyewall replacement cycle took place, weakening Maria to a high-end Category 4 hurricane by the time it struck Puerto Rico. Interaction with land further weakened the hurricane, though it regained some strength as it moved northeast of The Bahamas. Moving slowly to the north, Maria gradually degraded and weakened to a tropical storm on September 28. Embedded in the westerlies, Maria accelerated toward the east and later east-northeast over the open Atlantic, becoming extratropical on September 30 and dissipating by October 3, 2017.

The Red Incident Support Team, VA-TF1 & VA-TF2 (type 1 task forces), FL-TF1 & FL-TF2 (one type 4 task force and one MRP-Canine LF from each), and MRPs from MA-TF1 and CA-TF6 are conducting search and rescue operations, and TX-TF1 has arrived, in PR. Three IST personnel and 36 VA-TF1 personnel have moved forward and are conducting search and rescue operations in St. Croix. MA-TF1, IN-TF1, CA-TF6, CA-TF2, MD-TF1, CA-TF7 & NY-TF1 (enhanced NIMS type 4 task forces), were activated and deployed to PR via airlift. AZ-TF1, CA-TF4, TN-TF1 & CA-TF1 (type 1 task forces) were issued Alert Orders but not deployed.

Survey Data

Survey Response

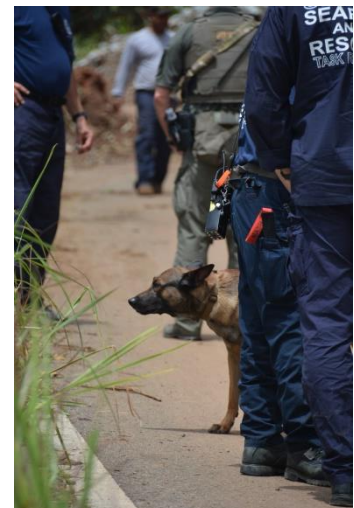
As the deployed IST Veterinary Officer the author created a canine roster. There were 33 handlers deployed with 35 search canines. Two handlers each deployed with 2 canines each.

Survey return was 54%, 19 out of 35 canines from 55% of handlers (18/33). One handler that submitted a survey deployed with 2 canines.

Handler Data

For the 18 handlers who completed the survey:

- Years on Task Force ranged from 1.5 to 24 years, with a mean of 10.7 years, median of 9 years; there was no mode
- It was a first deployment for 11% (2/18) of handlers while 89% (14/18) previously deployed



Canine Data

For the 19 Canines whose handler completed survey(s):

- Ages ranged from 2 years 6 months to 10 years 3 months, with a mean of 6 years 1.4 months, median of 6 years 4 months; there was no mode
- Male neuter 63% (12/19), female spay 21% (3/19), male 11% (2/19), female 5% (1/19)
- Labrador Retrievers 42% (8/19), Belgian Malinois 21% (4/19), Golden Retriever 11% (2/19), and one each Dutch Shepherd, German Shepherd, German Shorthair Pointer, Labrador Mix, Border Collie Mix 5% (1/19 each)
- Live Find comprised 95% (18/19) and Human Remains Detection 5% (1/19)
- It was first deployment for 26% (5/19) while 74% (12/19) had prior deployment

Mobilization and Demobilization Data

- Deployment for the Canine Search Teams (one handler with 2 canines, 15 canines total) was via ground and military aircraft 60% (9/15), military aircraft 33% (5/15), ground/commercial 7% (1/15), and ground 7% (1/15 each)
 - *Note: 4 handlers had been mobilized prior for Hurricane Irma and remained based in Puerto Rico for operations at Hurricane Maria; they were not included in mobilization data*
 - *One Handler mobilized to Texas via ground transport but was replaced by another canine search team before reaching Puerto Rico due to canine illness*
- Demobilization for the Canine Search Teams (one handler with 2 canines, 19 canines total) was via ground and charter transport for 47% (9/19), charter aircraft 32% (6/19), and one each for ground and commercial, charter and commercial, military aircraft, and ground at 5% (1/19 each)
 - *One Handler demobilized from Texas via ground transport after being replaced by another canine search team before reaching Puerto Rico due to canine illness*
- All handlers reported no transportation medical issues occurred for any canine during mobilization. One canine had a puncture wound prior to deploying but healed without complication

Operations

- Days deployed for the Canine Search Teams (one handler with 2 canines) ranged from 3 to 17 days, mean 9 days, median 9 days; there was no mode.
- 11% (2/19) Canine search teams, 19 canines total, were staged in the continental US: Georgia, and Texas; 89% (17/19) were staged outside the continental US (OCONUS), one handler with 2 canines, in San Juan, Puerto Rico and operated in San Juan, St. Croix, St. Thomas, St. John, Isla Verde. Two handlers staged in Delaware before transport to Puerto Rico.
- 89% (17/19) teams staged in a hotel in San Juan, 2 having staged prior to that in a hangar and a school. Two teams in the surveys (11%, 2/19) did not deploy to Puerto Rico; one staged at a hotel the other in a hangar.
- Briefings received by 100% (18/18) handlers included flood waters (94%, 17/18), local insects and animals (94%, 17/18), weather (89%, 16/18), endemic diseases (89%, 16/18), and boxed drinking water (11%, 2/18)

Decontamination

- Decontamination station was present at the hotel where all teams staged except the 2 that were not staged in Puerto Rico (89%, 16/18)
- Decontamination was performed on 63% (12/19) search canines; 37% did not (7/19)
- Of the decontaminated canines: 75% (9/12) had soap and water, 17% (2/12) had soap and water or water only, and 8% (1/12) had Simple Green™
- Contaminants of concern included flood waters, ocean water, sewage, dead animals, mud, biologicals

Medical Care

- 89% (16/18) handlers performed examinations on their 19 canines (84%, 16/19); 44% (8/18) reported they were the only ones doing these medical checks
- 53% (10/19) reported exams performed by other personnel: veterinarian for 42% (8/19), Task Force MD for 16% (3/19), Task Force Medic for 5% (1/19)
- Veterinary services on site and off were reported by 100% (18/18) handlers, and were identified as IST Veterinarian, Task Force DVM (may have been referencing the IST DVM), and local hospital which was listed in the IAPs.

Canine Illness

- No illness was reported for 95% (18/19) search canines
- Illness occurred in 5% (1/19): one became ill with swollen gland, lethargy, spinal pain while in route to Puerto Rico and was demobilized; further testing and treatment were performed at home for Toxoplasmosis
 - Note: one canine had diarrhea during Irma, but it was resolved before the event was switched to Maria

Canine Injury

- No injuries were reported for 95% (18/19) search canines
- Injury occurred in 5% (1/19): after jumping off a high wall there was cervical (neck) pain and muscle spasms; rest, medication, no neck leads, with follow-up at home base
 - Note: one canine had a puncture wound prior to deployment, which healed without complication during the deployment



Handler Comments

- Dr. Lori, Thank you for taking such incredible care of my boy in Puerto Rico. You were thorough, gentle and respectful of his space until he got to know you. Your treatment plan was cogent and reasonable. You did not over treat or lay out a plan that was not reasonable to follow. I want to thank you again for taking such professional and compassionate care of my guy in his time of need. He has shown no further signs of issues. I have taken him to my personal veterinarian and gave him your detailed report. I will be making a follow-up appointment in the new year at a Neurologist at your suggestion. Continue to be the incredible advocate for our 4 legged team members and train the next generation of team Vets and Med Specs to view and treat them the same way. Thanks again!
- The charter plane leaving San Juan required all dogs to have muzzles to board the plane. Apparently, they usually carry military dogs and were very adamant that we would not board the plane without them.
- Did not bring all equipment for K9; Decon went well.
- Demobilized from Irma at 9/17 at 1400 hrs., contacted to deploy to Maria 9/17 at 1845 hrs. IST and TF Leaders continue to need a better understanding of K9 capabilities and how to effectively and efficiently use us as an asset
- Dogs did not leave hotel
- This was my first deployment that was modular in nature. K9 handlers tended to attract each other. Some handlers were aware of things that others were not. Possible that a K9 handler briefing re: specific hazards or concerns – handlers able to share intel as well.
- Decon was only available after our second day of operations.
- Dog presented with what appeared to be sialadenitis after mobilization but prior to transport to PR. Dog was demobilized and replaced by another team canine. The salivary gland resolved quickly but the canine exhibited lethargy and spinal pain. He was later diagnosed with Toxoplasma and is currently undergoing treatment. Because of our team veterinarian's excellent relationships with specialists in our state, we were able to quickly determine that K9 should not continue on the deployment to PR. We were able to get him treated quickly and we hope to have him back in service soon.
- Went well: Having a dedicated vet for Task Force canines that had medical cache on hand to be able to treat canines if needed.
- Charter company tried to deny the large number of k9s on flight
- K9 as an MRP/Type 6 needs to be thought out. K9 decon was only set up with soap once we arrived because we purchased soap prior to flying.

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