

HorseReport

FALL 2022



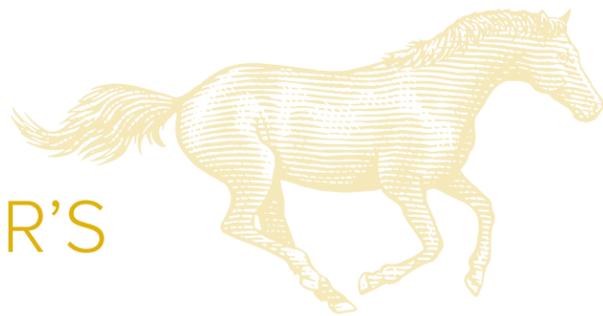
*Horses and
Wildfires*

THANKS TO OUR COLLABORATOR



Dr. Lais Costa, MV, MS, PhD, DACVIM-LA, DABVP-Equine, is the director of operations for the UC Davis Veterinary Emergency Response Team and director of the International Animal Welfare Training Initiative. Her interests lie at the intersection of health and welfare of animals and humans and their interactions with the environment. Her focus is in understanding and mitigating the impacts of disasters on animals, especially in vulnerable communities.

DIRECTOR'S LETTER



Welcome to the fall issue of the *Horse Report*!

It is hard to believe that we are in the final months of 2022. It has been a busy and exciting year here at CEH! We have especially enjoyed having more in-person opportunities with our students, donors, and colleagues in recent months. We look forward to a dynamic and educational year ahead, and hope to see you at one of our events!

For this issue of the *Horse Report*, we have chosen to focus on an unfortunately necessary and timely topic, horses and wildfires. As I write this letter, the Mosquito Fire, which has consumed 77,000 acres in Placer and El Dorado Counties, is finally at 95% containment after a month of suppression efforts. The UC Davis Veterinary Emergency Response Team (VERT), led by Dr. Lais Costa, has been on-site at evacuation centers, providing care to animals affected by the wildfire.

We are grateful to Dr. Costa for sharing her extensive expertise with us to bring you the most up-to-date information about horses and wildfires in this issue. From Hurricane Katrina to the Camp Fire, she has witnessed both the horrors and the miracles born by natural disasters. Her passion and dedication have inspired many of our students to become involved in disaster preparedness and emergency response.

Special thanks also to Professor Emeritus and former VERT director Dr. John Madigan for sharing his experiences with managing loose horses during wildfires. Drs. Joie Watson and Gary Magdesian also contributed their expertise on the effect and treatment of smoke inhalation on horses, a topic that we have covered on our social media accounts.

Years of severe wildfires have forced all equestrians to rethink our approaches to planning for, and responding to, natural disasters in California. The top recommendation given by all of our experts is to plan ahead and evacuate early to ensure the safety of your animals.

I hope this issue inspires you to design and practice a carefully thought out disaster preparedness and evacuation plan. As Dr. Costa says, “you can’t predict, but you can prepare.”

All of us at CEH wish you a safe and healthy fall season,

Carrie J. Finno, DVM, Ph.D., Diplomate ACVIM
CEH Director



DRS. HALES AND SHAFFER Honored with 2022 Wilson Award

Drs. Erin Hales and Sarah Shaffer are the recipients of the 2022 James M. Wilson Award. This award recognizes graduate students or UC Davis veterinary hospital residents who significantly advance equine health through publication of the year’s most outstanding research reports.

Dr. Hales was chosen for her publication “Postmortem diagnoses of spinal ataxia in 316 horses in California,” published in the *Journal of the American Veterinary Medical Association* (2021, 258(12): 1386-93). Dr. Shaffer was honored for her publication “In vitro motions of the medial and lateral proximal sesamoid bones under mid-distance load conditions are consistent with racehorse fracture configuration,” published in the *Journal of Biomechanics* (2022, 130:110888).

Dr. Hales completed her PhD in animal biology at UC Davis under the mentorship of Dr. Carrie Finno. Her graduate work focused on equine neuroaxonal dystrophy/equine degenerative myeloencephalopathy (eNAD/EDM), an inherited neurodegenerative disorder linked to a vitamin E deficiency. She currently works in the field of personalized medicine at SomaLogic.

Her publication evaluated diagnoses of ataxia, or lack of coordination during movement, at post-mortem examination over 12 years in California. Her research identified cervical vertebral compressive myelopathy (CVCM or wobblers), eNAD/EDM, and trauma as the leading causes of diagnosable ataxia. These results have given veterinarians some insight into which disease may be affecting an ataxic horse in their care.

“Dr. Hales’ publication reflects a tremendous collaboration between clinicians and pathologists to carefully review medical

records and determine the top causes of spinal cord disease in California,” said Dr. Finno. “By providing data on which diseases are most likely to occur in which breeds, this study has a significant clinical impact.”

Dr. Shaffer completed her PhD in mechanical and aerospace engineering at UC Davis at the J.D. Wheat Veterinary Orthopedics Research Laboratory under the supervision of Drs. Susan Stover and David Fyhrie. Her research focused on how proximal sesamoid bone (PSB) fractures develop in racehorses. The PSBs are bones in the forelimbs and PSB fracture accounts for nearly 50% of U.S. racehorse deaths. As a postdoctoral researcher, Dr. Shaffer continues to focus on the biomechanical causes of PSB fractures.

Dr. Shaffer’s research helps explain the relationship between PSB fracture, internal biological changes in PSB morphology in response to mechanical loading, and racehorse training and racing history. She is creating a model to predict how race training influences PSB fracture risk. Dr. Shaffer has a lifelong interest in horses and hopes to continue working in equine biomechanics.

“Dr. Shaffer’s publication reflects an engineer scientist and accomplished horsewoman making a significant contribution to racehorse welfare,” said Dr. Stover. “Building on her work that elucidated the microscopic events leading to PSB fracture, this study discovered biomechanical factors that should be investigated to prevent PSB fracture.”

Congratulations on this well-deserved honor!



Dr. Hales



Dr. Shaffer and her horse, Beau.

Guidelines for Horses Exposed to WILDFIRE SMOKE



High concentrations of particulates can cause persistent cough, increased nasal discharge, wheezing, and difficulty breathing.

Fires throughout California and the western United States in recent years have exposed humans and horses to unhealthy air containing wildfire smoke and particulates. These particulates can build up in the respiratory system, causing a number of health problems for both species.

UC Davis equine specialists have offered these suggestions to serve as a general guide on the effects of horses breathing air laden with particulates.

What Is In Smoke?

Smoke is composed of carbon dioxide, carbon monoxide, particulate matter, soot, hydrocarbons and other organic substances, including nitrogen oxides and trace minerals. Different types of wood, vegetation, plastics, house materials, and other combustibles produce different compounds when burned, which affect the composition of the smoke.

Particulate matter is the major pollutant of concern in wildfire smoke. Particulate is a general term used for a mixture of solid particles and liquid droplets found in the air. Particulates from smoke tend to be very small at less than one micron in diameter, which allows them to reach the deepest airways within the lung.

How Smoke Affects Horses

The effects of smoke on horses are similar to the effects on humans and can include irritation of the eyes and respiratory tract, aggravation of conditions like heaves (recurrent airway obstruction), and reduced lung function. High concentrations of

particulates can cause persistent cough, increased nasal discharge, wheezing, and difficulty breathing. Particulates can also alter the immune system and reduce the ability of the lungs to remove foreign materials, such as pollen and bacteria, to which horses are normally exposed.

Assessing and Treating Smoke Inhalation in Horses

Horses exposed to fire smoke can suffer respiratory injury of varying degrees, ranging from mild irritation to severe smoke inhalation-induced airway or lung damage. Knowing what is normal can help you determine whether your horse may need veterinary attention.

Have your horse(s) examined by a veterinarian if any of the following are noted:

- Respiratory rate is consistently greater than 30 breaths/minute at rest.
- Nostrils have obvious flaring.
- There is obvious increased effort of breathing when watching the horse's abdomen and rib cage.
- There is repetitive or deep coughing, or abnormal nasal discharge.

Protecting Horses from Air Pollution

There is currently no available scientific data specifically regarding the impacts of various air quality index (AQI) levels on equine respiratory health. The American Lung Association provides guidelines and color-coding for AQI ranges, with green being the lowest (0-50) and maroon (301-500) the highest. These guidelines have generally been extrapolated for horses as well. The United States Equestrian Federation (USEF) recommends that event organizers consider cancelling or suspending competitions if the AQI

reaches 151 or above. Work with your veterinarian to determine the best plans for your individual horses, particularly if there is a history of respiratory issues such as heaves, asthma, or allergies.

Additionally, consider the following actions:

- Limit activities that increase airflow in and out of the lungs (i.e. exercise), which can trigger narrowing of the small airways in the lungs, when smoke is visible.
- Provide plenty of fresh water close to where your horse eats. Horses drink most of their water within two hours of eating hay, so having water close to the feeder increases water consumption. Water keeps the airways moist and facilitates clearance of inhaled particulate matter. This means the windpipe (trachea), large airways (bronchi), and small airways (bronchioles) can move the particulate material breathed in with the smoke. Dry airways cause particulate matter to stay in the lung and air passages.

- Limit dust exposure by feeding dust-free hay or soak hay before feeding. This reduces the particles in the dust such as mold, fungi, pollens and bacteria that may be difficult to clear from the lungs.
- Contact your veterinarian if your horse is coughing or having difficulty breathing. A veterinarian can help determine the difference between a reactive airway from smoke and dust versus a bacterial infection and bronchitis or pneumonia. If your horse has a history of heaves or recurrent airway problems, there is a greater risk of secondary problems such as bacterial pneumonia.
- If your horse has primary or secondary problems with smoke-induced respiratory injury, contact your veterinarian who can prescribe specific treatments such as intravenous fluids, bronchodilator drugs, nebulization, or other measures to facilitate hydration of the airway passages. Your veterinarian may also recommend tests to determine whether a secondary bacterial infection has arisen and is contributing to the current respiratory problem.

- Give your horse ample time to recover from smoke-induced airway insult. Airway damage resulting from wildfire smoke takes four to six weeks to heal. Ideally, give your horse that amount of time off from the time when the air quality returns to normal. Attempting exercise may aggravate the condition, delay the healing process, and compromise your horse's performance for many weeks or months. Horses should return to exercise no sooner than two weeks post smoke-inhalation, following the clearance of the atmosphere of all smoke.

Read the full article at: <https://www.vetmed.ucdavis.edu/news/guidelines-horses-exposed-wildfire-smoke>.



Air Quality Index	
Air Quality Index (AQI) Values	Levels of Health Concern
0 to 50	Good
51 - 100	Moderate
101 - 150	Unhealthy for Sensitive Groups
151 - 200	Unhealthy
201 - 300	Very Unhealthy
301 to 500	Hazardous

Source: AirNow

Dr. Lais Costa (L) and colleagues responding to the LNU Lightning Complex fires in 2020.

From Tears to Cheers: The Realities of Working in DISASTER RESPONSE

Dr. Lais Costa has seen it all. From tearful farewells to cheerful reunions, she is dedicated to making a difference in the face of natural disasters. Dr. Costa is the Director of Operations for the UC Davis Veterinary Emergency Response Team (VERT), a group of veterinarians, technicians, and students that provides veterinary care during disasters through Mutual Aid to northern California Counties. She graciously shared her experiences and thoughts about working in disaster response.

How did you get involved in this type of work?

My first experience was as an emergency veterinary clinician at Louisiana State University when Hurricane Katrina hit in 2005. The Lamar-Dixon Shelter had 500 horses. We were there from the beginning to the end, and I found the reunification of owners with their horses really rewarding.

In 2017, I was working at the UC Davis veterinary hospital when we treated horses from the Tubbs fire. That experience made me realize that veterinary professionals can really make a difference. After attending a recruitment seminar for VERT,

I decided to join. In 2018, I participated in training on technical rescue, sheltering, and other topics. Additionally, I had the unique experience to train with the National Veterinary Response Teams, which are under the U.S. Department of Health and Human Services.

What is the Veterinary Emergency Response Team (VERT) and what is its role?

This year is the 25th anniversary of VERT! Professor Emeritus Dr. John Madigan founded VERT to respond to misfortunes of individual animals. As natural disasters changed in frequency and severity, VERT evolved in response. In particular, the 2018 Camp Fire made a mark in terms of how a local community can respond and care for animals during disasters.

What is the California Veterinary Emergency Team (CVET)?

CVET is a state resource administered by the UC Davis School of Veterinary Medicine in collaboration with the California Department of Food and Agriculture (CDFA), which is

responsible for the California Animal Response Emergency System (CARES), and the California Governor's Office of Emergency Services (Cal OES). Disaster responses start and end locally. State resources have to be requested when the situation progresses and overwhelms local resources. CVET will be deployed upon direct request from the agency having jurisdiction to assist and provide the veterinary support when local resources are about to be exhausted.

How can owners and communities make evacuations as easy as possible?

Permanent identification, microchips or tattoos, facilitates reunification of animals with their owners. Be sure to register microchips and update your information when there is a change of address or phone number!

Be prepared by knowing if you are in a high-risk fire zone and monitoring red flag days. Be ready to evacuate as soon as warnings are in place. Understand the hazards around you. Make sure your horse knows how to load easily in a trailer. Do evacuation drills with your horses so they get used to going through the motions in a non-emergency environment. Being prepared takes time and effort.

Have all records, medications, water and hay ready. Know your evacuation center options and the route to those locations. Plan alternative routes in case roads are closed. If you do not have a trailer, have a plan with someone who can help you. Find out what resources you have in your area, such as community animal response teams (CARTs).



Dr. Costa evaluating an evacuated horse.

What is the most important thing owners should know about horses and wildfires?

Be prepared. Horses read people faster than people read themselves. If the person is prepared, doesn't panic and has a plan, the horse will cooperate. Look at the flaws in your plan and work through them until it becomes second nature. It is a low frequency, high-risk event. If you have the proper mindset, you won't panic. Nothing can replace preparedness.

What research is important to our understanding of how to treat horses affected by natural disasters?

We do not think enough about chemical contamination, particularly with wildfires. When structures burn, contaminated ash gets on the skin and in the hair coat (horses groom themselves and each other with their teeth), and horses can ingest and inhale contaminated particles. We need to do more research to identify things that are harmful in these situations so we can have a decontamination plan for the animals and responders.

Where do you see this field going in the future?

I would like to see a focus on preparedness in all phases of disasters, before, during and after the incident. Preparation is essential to every stage. You have to be prepared to prevent the disaster in the first place. When it happens, you have to be prepared to protect the property and mitigate the impact of the fire. You have to be prepared to respond if the fire directly affects you and your property, and you have to be prepared to recover. You can't predict, but you can prepare.

What keeps you going during the difficult situations?

The reward of helping animals and people in difficult times is priceless. Sometimes there are misfortunes and sadness, but we can learn from the situation and do better next time.

The other thing that keeps me going is the commitment of our students. They work hard. VERT gives them training and hands-on experience to make a difference. VERT currently has over 300 students!

Learn more about VERT at <https://ohi.vetmed.ucdavis.edu/disaster-preparedness-response/vert>.

Should horses be turned loose if a fire is rapidly approaching?



Read the original full article, written by Dr. John Madigan, DVM, DACAW, Distinguished Professor-Emeriti, at our Disaster Preparedness Resources webpage: <https://ceh.vetmed.ucdavis.edu/health-topics/disaster-preparedness>

The best method for preventing injury to horses during a wildfire is to evacuate early. The other option is to shelter in place, which includes the possibility of having to decide whether to turn horses loose if the fire changes speed or course and evacuation is no longer an option. Turning horses loose comes with a new set of risks to consider.



Train your horses to load into a horse trailer and make sure there is enough trailer space for all of the horses on the property.

Evacuation

There is no substitute for a well thought out and rehearsed evacuation plan. Evacuate early, if possible. The roads may close and you will not be allowed access if you wait too long.

Even with the best plans, several factors can impede evacuation efforts. These include:

- Lack of halters and lead ropes
- Not enough people with skills to quickly and safely catch, halter and lead horses
- Horses that are not trained to load
- Not enough trailer space for the number of horses on the premises
- Young horses, mares and foals, and stallions, which complicate handling and loading
- Flames, heat, and smoke, which make conditions unsafe for humans

Shelter in Place

If evacuation becomes impossible, sheltering in place is the remaining option. Remember that if you are not safe sheltering in place, your horses are not safe either. If you must shelter in place, take the following actions:

- Clear brush and debris at least 100 feet in all directions.
- Attempt to obtain a fire suppression team to defend the space or determine if it is defensible.
- Remove horses from all nearby structures.
- Provide food and water.
- Turn on a generator for power and run sprinklers in fields where horses may be sheltered.

- I.D. the horses:
 - Paint, tag, collar, phone number written on hooves, cattle ear tags placed in mane, etc.
 - Remove blankets.
 - Hose off horses prior to placing in a large field.



Ear tags placed in the mane can provide temporary identification.

Turning Horses Loose

When a horse facility is in immediate danger with no defensible space and no chance for evacuation, opening field and pasture gates, stalls doors, and removing any other restraints will potentially allow horses to escape the flames. If it comes to this, take the following actions:

- Attempt to create and direct horses to a secondary confinement area.
- Take precautions to prevent horses from reentering the area. They may attempt to return to a familiar place even when flames are present.
- Immediately notify 911 of loose horses so first responders in the area can be alerted. First responder entry could be impeded by loose horses on driveways or roadways.
- Put out a call for horse groups to converge at a distant location, but close to where loose horses are, and to bring halters, grain buckets to facilitate catching horses, and trailers.

Once horses are out of your control, safety issues may arise for both horses and people in the area. Horses could enter major roadways with traffic and be hit by evacuating or responding vehicles, potentially injuring the horse(s) and people in the vehicle. Horses could suffer trauma from falling while running on slippery roads, kicking other loose horses, running through

fences or barbed wire, and obtain other flight-related injuries. Horses that are wearing halters (especially those made of nylon) could suffer facial injuries from excessive heat or hook halters on fences, posts, and other objects. However, horses that are wearing halters are easier to catch, so breakable leather halters or ID collars are preferable whenever possible.

Encountering Loose Animals

If you encounter loose horses, the following actions are recommended.

- DO restrict the area where the loose animals can travel by closing gates as soon as possible.
- DO direct loose animals to a fenced area, allow time for them to settle, and move them when conditions are suitable.
- DO move the animals quietly and slowly using the fewest number of people possible.
- DON'T allow too many people to get involved or interfere with capture operations as it may subject people to risks and injuries.
- DON'T be in a hurry. Stay calm, move slowly, and do not encourage the animals to flee by chasing them.
- DON'T turn on sirens or lights if approaching loose horses or livestock.
- DON'T try to move horses or livestock with cars or vehicles.

Conclusion

There are humane grounds for opening confinement areas when intense fire is about to engulf a facility. In those circumstances, if horses are trapped, releasing them is appropriate. However, it is not without its own risks. Make your own decisions considering all of the factors described. Nearly everything about a wildfire carries some degree of risk. The best approach is to be prepared and evacuate early.



Prevent the need to turn horses loose under threat of injury by fire

- Know your county's equine evacuation plan(s).
- Become an active member of the local evacuation and disaster response team.
- Train horses to load, practice evacuation prior to fire season, and develop a phone tree for others with trailers.

<https://ceh.vetmed.ucdavis.edu>

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UC DAVIS VETERINARY EMERGENCY RESPONSE TEAM (UCD VERT)

The **Veterinary Emergency Response Team** at the UC Davis School of Veterinary Medicine is a volunteer organization of faculty and staff veterinarians, veterinary technicians and veterinary students that provides training on veterinary emergency and disaster response, as well as field veterinary services to animals injured during disasters. Originally formed in 1997 after the Yuba County floods, the unit provided large animal technical rescue and equine helicopter rescue for large animal accidents, as well as response to small- and large-scale disasters for Yolo and adjacent counties. In January 2008, VERT became a registered Medical Reserve Corps (MRC) Unit, which is a program under the umbrella of the Civilian Volunteer Office of the Surgeon General and part of the National Citizen Corps Program.

Members of the UCD VERT are registered Disaster Healthcare Volunteers (DHV) at the DHV Medical Reserve Corps, as well as Disaster Service Worker Volunteers at the Yolo County Office of Emergency Services.

The UCD VERT can be deployed in Yolo and other counties upon request by the Yolo County Office of Emergency Services (OES), or in declared state disasters. Over the years, VERT'S response has ranged from assisting in the effort against the H1N1 influenza pandemic of 2009 to wildfire response, including the Tubbs Fire in 2017, Camp Fire in 2018, Kincade Fire in 2019, Lightning Complex and North Complex Fires in 2020, Dixie and Caldor fires in 2021, and Mosquito Fire in 2022.

This program relies on donor support and does not charge for its activities. Donations can be made to the Veterinary Emergency Response Team to support emergency response to assist animals in disasters by contacting the Office of Advancement at svmadvancement@ucdavis.edu, (530) 752-7024.

VERT members provided support for animals affected by the Caldor fires in 2021.

