

beyond rescue: animals in disasters



ifaw

IFAW US Disaster Response Report

23,649 wild animals, 11,550 companion animals, 15,675 farm livestock, 50,874 total animals in 16 countries who benefited from ifaw's emergency interventions from July 1, 2017–June 30, 2018.



IFAW Senior Program Officer, Jennifer Gardner, carries "Panda" to the rescue vehicle during an animal search and rescue assignment in Butte County, California.

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about IFAW

The International Fund for Animal Welfare (IFAW) is a global non-profit helping animals and people thrive together. We are experts and everyday people, working across seas, oceans, and in more than 40 countries around the world. We rescue, rehabilitate, and release animals, and we restore and protect their natural habitats. The problems we're up against are urgent and complicated. To solve them, we match fresh thinking with bold action. We partner with local communities, governments, non-governmental organizations, and businesses. Together, we pioneer new and innovative ways to help all species flourish. See how at ifaw.org.



foreword

On this shared stage of a dynamic earth, it is no surprise that natural disasters are a fact of life, a burden shared by both ourselves as well as the planet's animals. In the era of climate change, it is also evident that humankind has aggravated the planetary system, pushing imbalances and testing the natural timeframes of the earth to self-regulate.

Disasters are escalating in both frequency and severity, unleashing devastation on a scale that is sadly becoming all too familiar. Within this context, we must fully understand that humans are not alone in facing the resultant outcomes of these ongoing natural disasters. Animals and all wildlife are at the mercy of these events, forced to endure the aftermath that can produce widespread death, habitat fragmentation and destruction, as well as the onset of a new way of life. One key difference is that animals do not have the social support mechanisms of human society that, while imperfect, are immensely critical in such times of need. It is this need, which IFAW and its immensely talented Disaster Response & Risk Reduction (DRRR) team, has stepped in to meet.

For over four decades, IFAW has responded to disasters both domestic and abroad, steadfast in its commitment to each individual animal. And why? **Because each individual matters.** They matter in the context of conservation and they matter due to the inherent value that we place on animals and their inextricable link to the wellbeing

of our human community. Whether through rehabilitating injured animals, reintroducing wildlife back into its natural environment, or reuniting families with their companion animals, IFAW works to return a sense of normalcy as well as hope to both human and animal communities that suddenly find themselves in upheaval as a result of a natural disaster.

It cannot go without mention that our world is also grappling with yet another disaster—one that has upended fundamental aspects of our lives. From changes in our daily routines to basic norms of social interaction, our lives are now different.

Indeed, layered atop the climate woes of the 21st century, this report is being published **in the midst of the COVID-19 pandemic**—not the first of its kind, but certainly one of the broadest and most socially widespread pandemics in our modern existence. And as such, IFAW's DRRR efforts must evolve to meet such challenges. Though many of us have taken both our personal and professional lives almost fully virtual since the beginning of quarantine, disasters are unmistakable in their physicality. Thus, responders must act in person to provide the most effective relief possible, even though zoonotic disease and the ease of its spread immensely complicates this response for all involved. What does a multispecies evacuation look like while maintaining social distancing? Such questions may not be fully answered for some time as we make our way through this new world. One thing is certain, however – that no one

was fully prepared for a pandemic and disease is one type of global disaster that modern society has tended to dismiss and ignore. **We cannot go down this same path.**

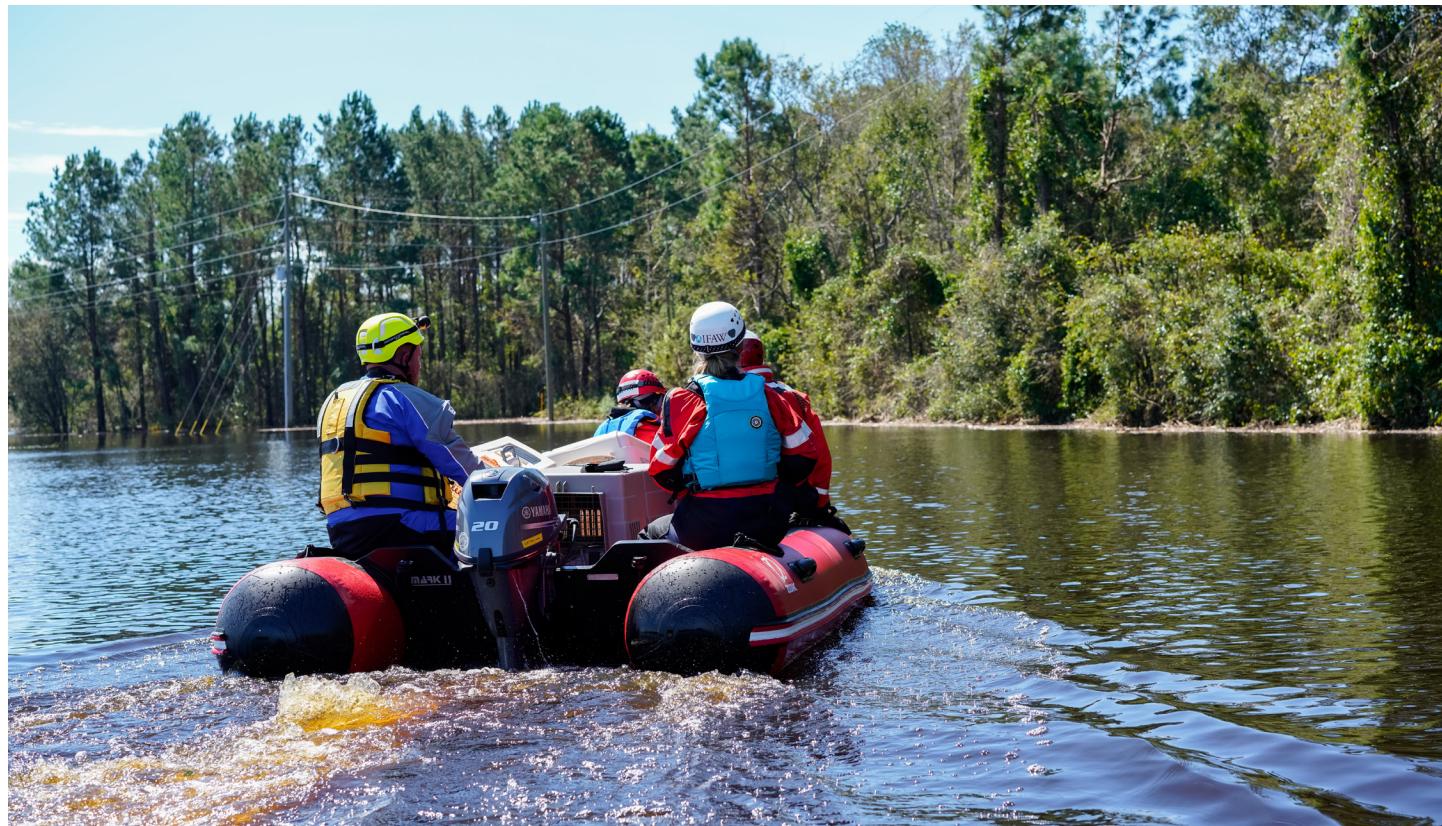
The work the IFAW team does both on-site and behind the scenes is critical, as are the lessons learned, for those are the lessons that will guide us as we propose and implement solutions to reduce the suffering of both people and animals in disasters yet to be faced. As disasters are a shared burden, let us ensure that our solutions provide a shared relief.

To your safety and to the future,



Azzedine Downes

Azzedine Downes
President & CEO, IFAW



introduction

Disasters are a fact of life on planet Earth. From bedrock to atmosphere, our world is constantly shifting, grinding, sparking, and no place is without its dangers. Serene forests can blaze in an instant, waves lapping against the shore can surge to the height of buildings, and prairies can turn to ice sheets swept by roaring winds. Despite this, Earth's inhabitants have found ways to live just about everywhere, and modern societies continue to sprawl across floodplains, turn deserts into lawned subdivisions, and generally brush aside history and geophysics.

While the planet may provide the kindling, humans are often the match that sets off the fire, and this has never been more literal than in the current period of climate change, which is introducing ever more energy into an already loaded system. Hundreds of years of industrialization and population growth have also expanded our global footprint into

regions where permanent settlement is a risky proposition. **These and other factors have nearly doubled the rate of natural disasters in the last quarter century.¹** Whether brought on by hubris or just as a consequence of many necessary decisions, we have created a dangerous context in which, on any given day, some part of the planet verges on its next catastrophe.

We do not shoulder these burdens by ourselves. Animals are often right there alongside us, as pets, livestock, service animals, and wildlife—and while some may be able to find their way to safety in times of a disaster, many others are made vulnerable by confinement, dependence, and habitat fragmentation.

In this report we will examine how to face these facts by reviewing recent natural disasters and unpacking their effects on communities and animals; we will then propose mitigation plans for the disasters yet to come.

At the International Fund for Animal Welfare, our core mission is to implement fresh thinking and bold action for animals, people and the place we call home. We have over four decades' experience of responding to disasters, getting animals out of harm's way and helping to rehabilitate the injured. The lessons we have learned are invaluable and can inform a more humane path forward.

Physics is undefeated. Our plans—for ourselves, for animals—must take this into account.

▲ Trained responders deploy on a flood water rescue mission in North Carolina after Hurricane Florence.

¹The Human Cost of Weather Related Disasters, Page 5
http://reliefweb.int/sites/reliefweb.int/files/resources/COP21_WeatherDisastersReport_2015_FINAL.pdf



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ifaw's DRRR program

IFAW protects animals and the places they call home. As one of the only global nongovernmental organizations that focuses on both conservation and animal rescue, we are in a unique position to address a broad range of threats to wildlife and domesticated animals. Our Disaster Response & Risk Reduction (DRRR) program dispatches emergency response teams to areas around the world where animals are in distress, whether as a result of natural or human causes. While many natural disasters cause great financial hardship and can tragically result in loss of human life, animals are often overlooked in the chaos.

Domesticated animals, dependent on human caretakers for survival, are often left to suffer, and even though wildlife has adapted to extreme situations to some extent, they can often be victims of injury or desperately lacking food and shelter as a result of the disaster. Even when the worst is over, natural habitats may take months or years to recover to the point where native species can return—assuming that these animals had anywhere else to go in the first place, hemmed in as they may be by civilization, islands of nature in a sea of development.

To lessen animals' suffering and provide urgently-needed support to communities, IFAW leads, funds and provides assistance to animal rescue groups to assess disaster situations, formulate plans, and take action.

We provide food, equipment, medical supplies, and emergency expertise to help rescue, provide care, and when safe to do so, reunify pets with their families and return wildlife to the wild. IFAW is constantly forging new collaborations to establish robust Animal Relief Networks in strategic places around the world, including Southeast Asia, India, Latin America, Europe, East Africa, the Greater Caribbean and the United States. This helps to build local response capacity for our partners through best practices which standardize preparedness, response and recovery protocols at the community level.

Three quarters of our resources in this arena are dedicated toward disaster preparedness including technical trainings, response planning, and risk assessments; the remaining quarter goes toward mobilizing responses when a disaster strikes. This ratio is deliberate and reflects the importance of establishing functional systems before we need them. Indeed, the first core principle of the Federal Emergency Management Agency's (FEMA) strategic plan is to "build a culture of preparedness."²

To this end, IFAW is a founding member of the National Animal Rescue and Sheltering Coalition (NARSC), an umbrella group that helps to coordinate planning and responses among 13 organizations, and which is partnered with the U.S. Department of Agriculture's Animal and Plant Health

Inspection Services (USDA-APHIS) and Federal Emergency Management Agency (FEMA) to respond to disasters. NARSC members commit to operating within the framework established by governmental disaster management agencies, which are focused first and foremost on the safety and wellbeing of humans; but because animals are so important to humankind—economically, psychologically, and culturally—it benefits both factions to harmonize our efforts and operate in a true partnership.

275,598

number of animals IFAW and local partners have rescued, treated, transported or sheltered since our first disaster relief deployment in 2000 to save rare South African penguins from a devastating oil spill caused by the cargo ship MV Treasure.

50,874

total number of animals (23,649 wild animals, 11,550 companion animals, 15,675 farm livestock) in 16 countries who benefited from IFAW's emergency interventions from July 1, 2017 – June 30, 2018.

▲ A search and rescue vehicle drives through the firegrounds during the 2018 Camp Fires in Butte County, California.

² <https://www.fema.gov/strategic-plan>



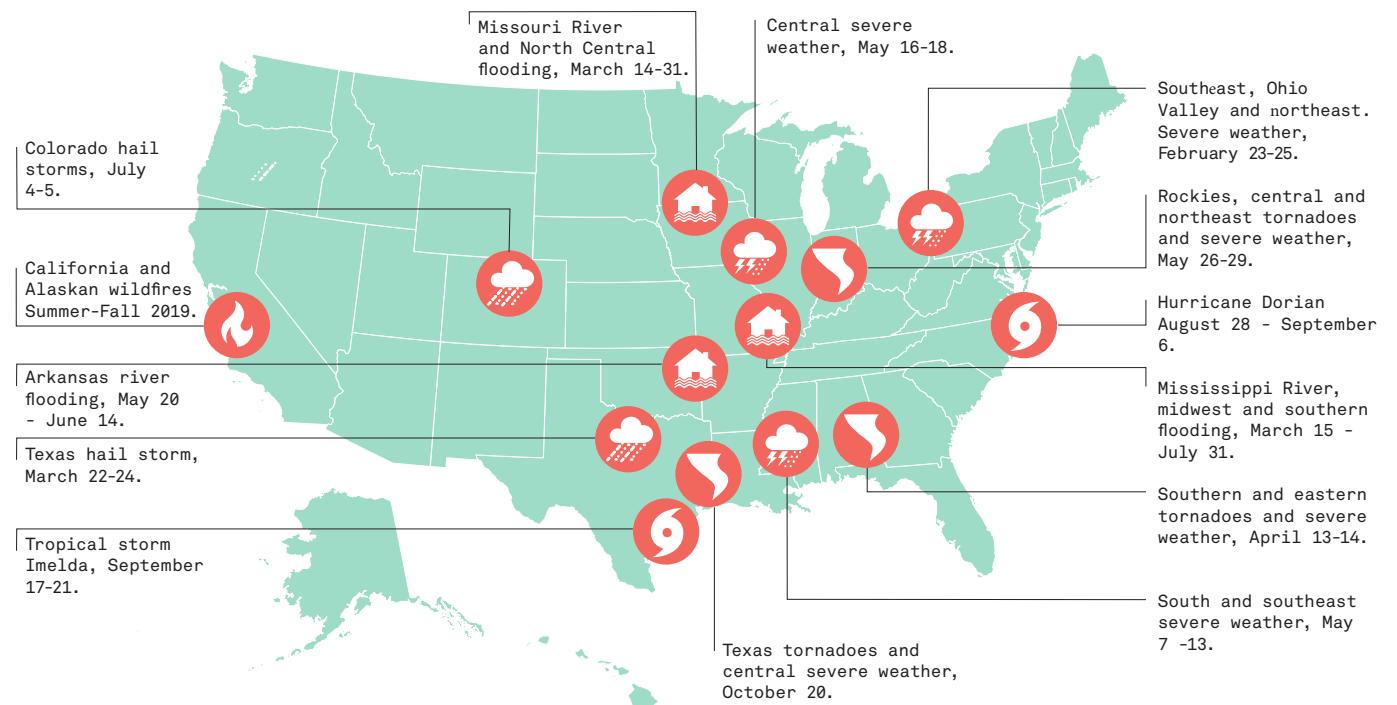
natural disasters

There are almost limitless ways that weather and extreme environmental events can make our lives and the lives of animals difficult or even perilous. In this report, we will focus on events that arise suddenly and require an immediate response. It is important to note that the groundwork for a disaster is often laid far in advance: For example, drought conditions or the spread of invasive pine bark beetles can slowly dry a forest for months or years, priming timber to burst into flames after a lightning strike or errant campfire ember. **Therefore, long-term and incremental planning is justified—indeed, required—as well as the all-hands-on-deck response operations that commence when such conditions metastasize into full-blown emergencies.**

A weather or geophysical event, by itself, is not a natural disaster. In fact, the IUCN calls disasters “social constructs,” rightly pointing out that “they are largely determined by how society manages its environment, how prepared it is to face adversity, and what resources are available for recovery.”³ Although nature’s extremes land on all of us with the same force, the poorest people, as always, pay the highest costs.⁴ At a time when the frequency and the price tags of natural disasters are rising, many of our national political leaders are failing to lead, as shown in stark outline by the ongoing battle for relief efforts in Puerto Rico, still recovering from the ravages of Hurricane Maria; in the desperate months in New Orleans following Hurricane Katrina; and more. Such

billion-dollar disasters—just one threshold for measuring the most severe emergencies—doubled in frequency between 1980 and 2016.

U.S. 2019 billion-dollar weather and climate disasters



This map denotes approximate locations for each of the 14 separate billion-dollar weather and climate disasters that impacted the United States during 2019.⁷

halting and inadequate responses showcase how marginalized peoples without adequate resources remain at highest risk.

However we define them, the costs of such events are high and growing. Natural disasters in the United States caused hundreds of human deaths and \$300 billion worth of damage in 2017 alone, mostly due to hurricanes and wildfires.⁵ **Billion-dollar disasters—just one threshold for measuring the most severe emergencies—doubled in frequency between 1980 and 2016.**⁶

For any given disaster there may be dozens, if not hundreds, of root causes and contributing factors. Our long-term planning should shine a light on those factors just as much, if not more so, than their dramatic consequences. As for cause, so for effect. Disaster preparations at all levels—from government agencies to

household plans—must be comprehensive and include provisions for animals. They must also account for complex scenarios because a single event—a hurricane, earthquake, or tornado—can lead to multiple threats that cascade and magnify one another. For instance, during an earthquake, the danger from seismic activity is not limited to shaking buildings; it can also disrupt electrical service, fracture roads, ignite fires, and otherwise create more hurdles for victims and responders.

flooding is the most common natural disaster, comprising nearly half (43%) of recorded events around the world.

◀ IFAW responder safely rescues “Star” and walks her to the trailer.

³ https://www.samhsa.gov/sites/default/files/programs_campaigns/dtac/srb-low-ses.pdf

⁴ https://www.samhsa.gov/sites/default/files/programs_campaigns/dtac/srb-low-ses.pdf

⁵ <http://www.ncsl.org/research/environment-and-natural-resources/natural-disasters-planning-preparing-and-paying-for-them.aspx>

⁶ Ibid (<http://www.ncsl.org/research/environment-and-natural-resources/natural-disasters-planning-preparing-and-paying-for-them.aspx>)

⁷ <https://www.ncdc.noaa.gov/billions/>



climate change as an amplifier

Over the last few decades, a major complicating factor has played havoc with our planet's weather patterns: anthropogenic climate change. As the U.S. Department of Defense emphasized in a 2015 report to Congress, "It is clear that climate change is an urgent and growing threat to our national security, contributing to increased natural disasters, refugee flows, and conflicts over basic resources such as food and water. These impacts are already occurring, and the scope, scale, and intensity of these impacts are projected to increase over time."⁸ It is tempting to think of climate change as a phenomenon that operates at a lower register than, for instance, a volcanic eruption—like an insistent background hum that grows louder only gradually, without our noticing it on a daily basis. This model fits in some respects: sea levels are rising year by year due to melting polar ice sheets and thermal expansion; average annual temperatures are creeping up. But climate change has its most dramatic effects as an amplifier. Climate change doesn't cause hurricanes, but it makes them

more powerful and more frequent. It doesn't cause wildfires, but it sets the table for drier woodlands that burn hotter and longer. These trends will only accelerate as certain "tipping points" are reached and greenhouse gas emissions increase and create an ever more vicious cycle of geophysical threats.

Most of us are aware of the marquee threats of climate change and ocean acidification, but climatological shifts are also changing the landscape in subtler ways. For example, in the United States, there has long been a tangible divide between the dry Plains region and the wetter Midwestern states, at around the 100th meridian—roughly bisecting the country in a line from the Dakotas to Texas. Climate change is causing that line of aridity to march eastward, and it now stands some 140 miles away from its historic bearing, at the 98th meridian.⁹ Meanwhile, in the oceans, marine heat waves have surged in frequency and intensity over the last century, contributing to coral bleaching, seagrass die-offs, and other severe impacts to biodiversity and ecosystem

services.¹⁰ In both instances, ecosystem features had long functioned to mitigate the destructive effects of extreme weather. Coral reefs dramatically reduce wave energy during storms, protecting coastlines.¹¹ Healthy, non-desiccated soil has greater capacity to retain water, reducing dangerous floods. As the geography of land and sea changes, so will the places that extreme weather impacts are felt; we will need to prepare for threats to strike places that, formerly, were better protected.

▲ The burned landscape after the Camp Fires swept through an area in Butte County, California

⁸ "National Security Implications of Climate-Related Risks and a Changing Climate" <https://archive.defense.gov/pubs/150724-congressional-report-on-national-implications-of-climate-change.pdf?source=govdelivery>

⁹ <https://www.sciencedaily.com/releases/2018/04/18041110957.htm>

¹⁰ <https://www.nature.com/articles/s41558-019-0412-1>

¹¹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4354160/>



how disasters impact animals

When a natural disaster strikes, our first impulse is to get people to safety, and many of us also immediately think about protecting "our" animals. But during a natural disaster it can be difficult to evacuate animals and provide them with shelter, food, and veterinary services, **unless a system has already been established**. In designing and carrying out emergency plans, it is not enough to leave animals as a last-minute consideration, and this point is driven home when we enumerate the ways in which we interact with and share our space with animals. Depending on the specific animal, they may represent everything from our livelihood to cherished companions, and animals are due—sometimes legally and always ethically—a high standard of care when confronted with danger. Here are just a few of the considerations for different groups of animals:

pets x companion animals

Many people are devoted to their pets and consider them members of the family. In the event of a disaster, if pet owners are not at home or otherwise able to evacuate with their animals, the separation can cause profound anxiety on top of the stresses and dangers attendant to getting oneself to safety. And even in cases where a pet owner is able to bring their animal to safety, emergency shelters and temporary housing often do not allow cohabitation or have the necessary supplies, such as food or kennels. Under the PETS Act of 2006, adopted shortly after Hurricane Katrina, federal assistance is available to states, counties, and cities that "account for the needs of individuals with household pets and service animals before, during, and following a major disaster or emergency."¹² While this law has helped to stimulate

more pet-friendly sheltering options such as co-located animal shelters or cohabitation shelters for the whole family, it does not mandate that hotels or other private businesses admit evacuees with their pets. The PETS Act also does not provide consideration for companion or domestic animals like horses, most amphibians, and a range of other less-common beloved pets.

▲ IFAW Senior Program Officer Jennifer Gardner approaches "Panda", an injured senior dog in need of care. The team was on an animal search and rescue assignment during the North Complex Fire in Butte County, California, when Panda ran towards the rescue vehicle.

¹² Public law 109-308 <https://www.congress.gov/bill/109th-congress/house-bill/3858>



service animals

These trained animals provide assistance to humans who have a disability, such as visually-impaired individuals, people with mental health needs, or those who suffer from seizures. While service animals are typically assumed to be dogs, the Americans with Disabilities Act was amended in recent years to include provisions for miniature horses. Depending on the person's level of mobility and independence, evacuation during an emergency may require extra planning, time, and resources. Service animals are by law allowed to cohabit with their owners; therefore, this statement does not apply to this category of animal. It is the responsibility of owners to confirm that appropriate support services for their service animals are planned for and available through their local emergency management system.

livestock and poultry

Cattle, sheep, chickens, hogs, and other livestock are raised around the country in industrial facilities, urban coops, backyards, and more. These animals are often a crucial component of a person's livelihood. With the exception of some larger farms, ranches, and grazing allotments, they are often constrained by fences or other man-made barriers that can provide both certainty (i.e., rescuers know where to find them) and danger (i.e., reduced ability to escape from fire or floodwaters) during a disaster. They may require specialized modes of transportation, and larger operations may not have enough trailers or other vehicles on hand to move more than a fraction of their stock at any one time. Livestock production also introduces disease risk factors, such as

during Hurricane Florence in the Carolinas, when numerous hog manure lagoons breached and contaminated surrounding areas with sewage.

unowned animals

What of the stray domesticated or feral animals that inhabit every community? Some community cat advocates have launched large-scale trapping programs in the hopes of evacuating strays, but these animals may be vectors for zoonotic diseases if they are not vaccinated, making it imperative for rescuers and rehabilitators to take safety precautions when handling. Because of disease transmission concerns, as well as logistical issues such as personnel and trapping supplies, the animals are typically left to fend for themselves. Caregivers may hurriedly move feeding stations to higher ground or anchor shelters with heavy objects or tethers, but sometimes the strays are forced to go it alone.

captive wildlife

Zoos, aquariums, and other exhibitors face special challenges when dealing with evacuation and emergency care of their animals. Not only do captive wildlife have hyper-specific needs for environment and diet, but there are often dangers associated with handling certain types of wild animals—whether posed to the animal, the handler, or both—and in the case of a natural disaster, trained individuals may be off-site or otherwise unavailable to provide oversight. Like livestock, they require specialized modes of transportation, though some facilities have hardened infrastructure and a shelter-in-place plan to allow animals to survive extreme weather. The Association of

Zoos and Aquariums (AZA) and Global Federation of Animal Sanctuaries (GFAS) includes disaster management in its accreditation process (as well as ongoing training) but it is vital to ensure adequate coordination with first responders and local authorities; Non-accredited facilities may pose an even greater challenge.¹³ Notably, USDA licensure does not require any kind of emergency planning or preparedness, even for dangerous animals kept in disaster-prone areas. Individual exotic pet owners are often not subject to animal registration or facility inspections, so their locations and the risks they present are frequently unknown to first responders until disaster strikes.

Depending on the state, there may be no list of unaccredited facilities that hold wild animals. For example, although we know that hundreds of tigers are confined in backyard cages in Texas, we don't have a precise figure or even a comprehensive list of locations.

biomedical research animals

The U.S. Department of Agriculture (USDA) reports that nearly 800,000 animals were housed in laboratories in 2017, many of them in disaster zones.¹⁴ Puerto Rico, for example, was devastated by Hurricane Maria in 2018. While IFAW does not condone such facilities, the reality is that they exist, so we must plan accordingly. According to USDA records, research facilities in the territory held 4,673 captive nonhuman primates in 2017, out of more than 75,000 nationwide in the United States. Like captive wildlife, animals kept confined for laboratory experiments may have specialized needs and attendant complications during an emergency. This industry involves huge potential risks in addition to humane considerations, since biomedical research can involve infecting animals with diseases that can be transferred to humans and other animals, including everything from cold viruses to much more serious threats: for example, some chimpanzees in Texas,

Florida, and Louisiana are infected with diseases like hepatitis and HIV, and require special handling in order to protect human caretakers. And because these animals are often purposely sickened or injured, they require special care to prevent additional pain and trauma in a disaster situation.

emergency response animals

During a disaster, trained animals, such as detection dogs and patrol horses, are employed to aid humans in search and rescue operations. These animals need proper care in the midst of what can be a chaotic and dangerous situation.

wildlife

Wild animals are often believed to fend for themselves in disasters. To the contrary, research has shown that extreme weather events can have profound and long-lasting negative impacts on wildlife.¹⁵ The increased frequency and severity of extreme weather events, combined with already degraded habitats and wildlife compromised by hunting or other human activities, creates a situation from which wild populations may not be able to rebound. Individuals may suffer when they become physically injured, when local food sources are destroyed and no other viable habitat patches are available, or when social species become displaced away from their flocks, packs, or troops. Wild populations suffer when breeding sites are destroyed, diseases are spread following disturbances, or mass mortalities cause local extirpations. Additionally, wild animals that are injured or searching for food or cover after extreme events may enter areas populated by humans, creating a dangerous situation for humans and for themselves. Having trained responders on hand to safely capture wild animals, and veterinarians, rehabilitators, and caregivers experienced and equipped to treat animals that cannot immediately be released back to the

wild helps to reduce the impact to wild populations and ensures that the public and individual animals remain safe. Compared with domestic animals or captive wildlife, we have less direct control over most non-captive wildlife populations, but communities large and small should be taking evacuation routes into consideration when planning for disasters. For humans, this means roadways; for wildlife, this means wildlife corridors. Maintaining or re-creating threatened habitats to safer refuges will give animals the opportunity to escape from harm. Some animal care facilities are also equipped to deal with injured wildlife, allowing for reintroduction after the danger has passed.



▲ IFAW responder Diane Treadwell pets a rescued horse while deployed with IFAW during the 2020 North Complex Fire in Butte County, California.

¹² Public law 109-308 <https://www.congress.gov/bill/109th-congress/house-bill/3858>

¹³ <https://www.aza.org/from-the-desk-of-dan-ashe/posts/weathering-the-storm>

¹⁴ https://www.aphis.usda.gov/aphis/ourfocus/animalwelfare/sa_obtain_research_facility_annual_report

¹⁵ <https://onlinelibrary.wiley.com/doi/epdf/10.1111/ddi.12878>



case studies

California wildfires

The Camp Fire ripped across northern California in 2018, eventually gaining the grim title of the state's largest and deadliest fire of modern times. Eighty-six people died in the blazes, which also destroyed 14,000 homes and buildings, displaced tens of thousands of residents, and forced a major electric utility into bankruptcy proceedings.¹⁶ The staggering impacts may also be the new normal. NOAA reported that July 2018 was California's hottest on record, with dry conditions helping to turn the landscape fire-prone, a trend line that has been decades in the making.^{17, 18} Over the last five years, wildfire has consumed an average of 233,000 acres annually, and in 2018 that mark hit 1.6 million acres, a footprint larger than Delaware.¹⁹

Among its many victims, the Camp Fire put countless domestic animals and wildlife in danger. IFAW's disaster response team deployed at the request of our partner organization in Butte County, the North Valley Animal Disaster Group (NVADG), to perform search and rescue operations, organize volunteers at temporary

shelters, and reunify pet owners with their beloved animals. The fire's ferocity and immense speed forced people to flee quickly and many were separated from their pets in the rush. Due to restrictions at human shelters that do not accommodate pets, many people who rescued their pets from flames dropped them off at temporary animal shelters run by NVADG. As the number of animals in Butte County's shelters climbed to over 2,000 and with many more animals behind fire lines in need of rescue, NVADG called on IFAW's disaster response team for support. Our disaster response team immediately assembled, drew up response plans, packed necessary equipment, and joined NVADG in Chico, California. One of the community's largest needs was for temporary animal shelters, and our disaster response team served a key role in fulfilling this need by offering their animal welfare expertise. In addition to rolling up our sleeves to clean cages, walk dogs, and calm frightened cats, the team provided guidance on shelter operations to the stream of local volunteers offering their time to help those in need. It was not just cats and dogs that arrived in shelters, but also chickens, bearded dragons, horses, pigs, goats, rabbits, macaws, and rats—all of which received the unique care they needed.

Responder Barb Davis carefully holds an injured dog rescued from behind the fire line.

timeline

September 2013 Floods - Colorado

IFAW helped Colorado Horsecare Foodbank source hay for 1,000 starving horses impacted by record-breaking floods in Colorado.

May 2014 Tornado - Tupelo, Mississippi

IFAW helped find homes for more than 100 dogs from the Tupelo-Lee Humane Society that was overwhelmed with a surge of intakes after a EF5 tornado destroyed parts of the city.

IFAW responders also supported animal search and rescue missions behind fire lines. Emergency workers noted that, as residents used the NVADG shelters to procure veterinary services for their animals—or be reunified with beloved pets—the intensely stressful situation was made slightly more bearable.

The Camp Fire was an extreme example of what might come to be the new normal, and we can find a few hard lessons among the ruins. As mentioned earlier, settlements in the wildland-urban interface will be exposed to stronger and more frequent fires in the years ahead, so steps should be taken to disincentivize development there. In older communities like Paradise, California, which was essentially wiped out by the Camp Fire, some buildings may not be up to current code.

Authorities can help to prevent some future damage by requiring higher standards for new construction, encouraging building owners to follow "ember resistant" retrofitting and maintenance guidelines, and taking other preventive measures.²⁰

Emergency response systems should also be updated and augmented: During the Camp Fire, first responders were initially hindered by the loss (in the flames) of critical and costly equipment like radios and wildland fire protective gear, which is essential for safely rescuing animals behind fire lines. A nearby distributor of the gear supplied replacements in under

24 hours, allowing animal rescues to continue seamlessly and safely, but the situation would have been dire if resupply had taken longer.

September 2020 wildfires

California and a large swath of the West Coast including parts of Oregon and Washington, once again continued to suffer the ravages of massive wildfires fueled by the extreme conditions exacerbated by climate change. Dubbed the 'North Complex Fire' or 'Bear Fire', temperatures of alarming intensity have resulted in a new slew of devastating fires across the area, especially in California, with tremendous impact not only on the ground, but also with regard to air quality for the region and beyond. In fact, as an article by the LA Times states in its title, 2020 is "the worst fire season ever. Again."

In response, IFAW's Disaster Response team once again deployed to Oroville, California in Butte County, to assist in relief efforts at the invitation of North Valley Animal Disaster Group (NVADG). Providing Animal Search and Rescue (ASAR) services, including emergency sheltering, the team simultaneously offered Emergency Operations Center (EOC) support and critical logistics and planning. One of the critical efforts undertaken by the team was to help support daily animal care at Del Oro Shelter, in addition to

setting up and managing a second temporary emergency shelter for evacuated small animals with the capacity to house 100 dogs and 100 cats. It was designed to expand for additional animals as further animals rescued from the wildfires are admitted. As part of this effort, IFAW supported veterinary care for injured animals, helping to cover expenses so families are able to stay together and are not separated due to the unforeseen and often overwhelming costs incurred from veterinary care. While several IFAW responders were deployed behind the fire lines, other responders focused primarily on managing the shelter and developing plans to reunite rescued pets with their families.

IFAW and its Disaster Response team continues to assist in this ongoing effort at the time of this publication.

¹⁶ <https://www.npr.org/2019/01/29/689591066/california-power-provider-pg-e-files-for-bankruptcy-in-wake-of-fire-lawsuits>

¹⁷ <https://www.ncdc.noaa.gov/news/national-climate-201807>

¹⁸ <https://calepa.ca.gov/2018/05/09/impacts-of-climate-change-in-california-significant-and-increasingly-stark-new-report-says/>

¹⁹ <http://cdfdata.fire.ca.gov/incidents/incidents-stats?year=2018>

²⁰ <https://www.nfpa.org/Public-Education/By-topic/Wildfire/Preparing-homes-for-wildfire>



Superstorm Sandy

When Superstorm Sandy hit the Eastern Seaboard in October 2012, it quickly became one of the most expensive hurricanes in US history, costing taxpayers, insurers, businesses and homeowners an estimated \$71 billion.²¹ Nearly 150 people died in Sandy's path through the Caribbean and up the US coastline, most of them in Haiti and New York, and the northeast United States took months (for

some residents, years) to recover from the aftermath of the storm. Power outages, disrupted transit and telephone systems, flooding, and other factors complicated the response efforts.

IFAW staff were embedded in FEMA's National Response Coordination Center in Washington, DC, in order to coordinate action between federal and state agencies and the National Animal Rescue and Sheltering Coalition (NARSC). IFAW rushed an animal search and rescue team to Oceanside, New Jersey, and also provided expert staff and emergency

grants to help feed animals, repair impacted shelters, care for the influx of stranded animals, and replace destroyed medical supplies. IFAW helped more than 2,800 animals following Hurricane Sandy on the ground in five (5) affected states.

Partly due to New York's effective implementation of the PETS Act, companion animals in the state fared relatively well,²² considering the dire circumstances, but many other animals faced danger and death: Thousands of laboratory mammals drowned at New York University,²³ numerous pets did not survive despite the best



800 wild animals

were rescued, transported, and temporarily sheltered by IFAW responders, in partnership with the WildCare Foundation.

◀ A young raptor is held by rescue staff while undergoing rehabilitation for release back to the wild.

◀ IFAW Program Director for Disaster Response and Risk Reduction, Shannon Walatjys, feeds cats in place during the Hurricane Sandy response.



August 2016 300 domestic animals - Floods - Louisiana, USA

IFAW responded to historic flooding that struck Louisiana with daily care for more than 300 dogs, cats, chickens, rabbits, guinea pigs, and guinea hens dropped off at our temporary shelter at the Lamar Dixon Expo Center while owners were able to recover and start to rebuild their lives.



October 2016 300 dogs, cats, pigs, goats and other animals - Hurricane Matthew, North Carolina, USA

After the hurricane hit the Southeastern Coast of the US, we deployed an animal search and rescue team, transport truck and trailer, boats and emergency sheltering supplies to North Carolina. We worked in and out of flooded waters to rescue dogs, cats, pigs, goats, horses and cattle. Total animals helped during this event was over 300.



July 2017 200 community animals - Wall Fire - California, USA

When a devastating wildfire consumed more than 6,000 acres, IFAW supported two temporary shelters for 200 small and large animals that were rescued from behind the fire line or dropped off by owners as they evacuated to human shelters.



August 2017 500 community animals and 100 wildlife - Hurricane Harvey - USA

Hurricane Harvey brought record flooding to Houston, Texas. Our team helped local partners transport displaced animals and also awarded emergency grants to replace damaged or destroyed veterinary supplies and equipment.

Hatchling hawks thrown violently from their nests, fracturing wings and breaking legs. Box turtles trapped under piles of rubble and timber. Countless raccoons, skunks, squirrels, opossums, rabbits, and

²¹ <https://coast.noaa.gov/states/fast-facts/hurricane-costs.html>

²² <https://www.thedailybeast.com/how-pets-survived-hurricane-sandy>

²³ <https://www.nature.com/news/researchers-battle-storm-s-wrath-1.11756>

²⁴ <https://blogs.ei.columbia.edu/2017/10/23/new-york-is-still-feeling-the-effects-of-hurricane-sandy-five-years-later/>



songbirds separated permanently from their kin, who may not have survived the storms.”²⁵ Wildlife rehabilitation experts refer to spring as “baby season,” and young animals featured heavily among the rescued individuals.

To help pick up the pieces of this ravaged area, IFAW responders helped pull domestic pets from debris, reunited with their families, and supported temporary sheltering for 800 wild animals, in partnership with the WildCare Foundation of nearby Noble, Oklahoma.²⁶ Not long afterwards, a second tornado destroyed parts of WildCare’s rehabilitation center. IFAW funded construction of new, stronger enclosures, so that the important work of wildlife rescue and rehabilitation could continue in years to come.²⁷ Moore and Noble are in the high-danger zone known as “Tornado Alley,” but some researchers believe that climate change may shift the timing and regions of the country where tornadoes and severe thunderstorms occur, so preparation and risk management are absolute necessities even outside of historic tornado zones.²⁸

A major blizzard swept across Montana in March 2018, paralyzing the region with deep snow and bitter cold. Among the hardest hit were members of the Blackfeet, Northern Cheyenne, and Fort Belknap Indian Reservations. State officials, however, elected not to make an official disaster declaration, which meant that the tribes were ineligible for state or federal relief—but the U.S. Department of Agriculture understood the danger the blizzard posed, and facilitated communication between Tribal leaders and NARSC. IFAW raised \$20,000 from donors to buy over 1,000 tons of hay for the reservations’ cattle, horses, and other livestock, saving animal lives and safeguarding a vital segment of the local economy.

\$20,000 raised from donors to buy 1,000 tons of hay for the reservations’ cattle, horses, and other livestock, saving animal lives and safeguarding a vital segment of the local economy.

◀ Cows eat hay provided to them by IFAW during the 2018 Montana blizzard.

<https://www.ifaw.org/united-states/news/oklahoma-tornado-update-through-great-adversity-wildlife-meets-unyielding-compassion>

²⁶ <https://www.ifaw.org/united-states/news/moore-oklahoma-tornado-update-special-moments-families-are-reunited-their-pets>

²⁷ <https://www.ifaw.org/united-states/news/moore-oklahoma-tornado-update-special-moments-families-are-reunited-their-pets>

²⁸ <https://www.c2es.org/content/tornadoes-and-climate-change/>

Montana blizzard

September 2017
220 community animals (dogs, horses) and 364 wildlife (pumas, sea turtles, chimpanzees, coral) - Hurricane Irma - U.S. Virgin Islands, Florida

On St. Thomas and St. John, we provided emergency relief for dogs, cats, horses and other animals suffering from lack of food and shelter after the hurricanes downed fences, removed roofs and destroyed access to fresh water. Later, IFAW helped reunite pets with their families. IFAW provided funding to Forest Animal Rescue to repair enclosures for pumas undergoing rehab; Loggerhead Marinelife Center for temporary sheltering of sea turtles; Save the Chimps for damages to their sanctuary; Central Caribbean Marine Institute for coral nursery repair; and to FloridaTRAC for emergency feed and veterinary care.

September 2017
500 community animals and 25 wildlife (parrots) - Hurricane Maria - U.S. Virgin Islands, Dominica

IFAW continued supporting the U.S. Virgin Islands with emergency relief for pets. Teams returned to the U.S. Virgin Islands to continue relief efforts from Irma and begin rescue efforts from Maria.

September 2018
170 community animals and 513 wildlife (water fowl) - Hurricane Florence - North Carolina, USA

IFAW’s technical rescue teams provided animal search and rescue support in Duplin County, NC and later reuniting pets with owners and assisting with emergency sheltering needs in Pender County, NC. Second team supported Carolina Waterfowl Rescue with daily care and transport after hundreds of birds were brought to shelter before and during the storm by private owners and neighboring animal sanctuaries.



what can be done

infrastructure and land use

"All disasters are local" is a mantra of responders. But the keys to minimizing damage are evident at every rung of the social spectrum: in our homes, our communities, and at the municipal, county, state, and federal levels. And, on a global level, we can reduce the amplifying effects of climate change by reducing greenhouse gas emissions. The U.S. National Climate Assessment, in describing our choices about land use, notes that these decisions "are influenced not only by the biophysical environment, but also by markets, laws, technology, politics, perceptions, and culture."²⁹ The same can be said for other decisions that affect our ability to mitigate and respond to natural disasters. We must use all the tools at hand. Solutions can be categorized in four main groups: infrastructure and land use, preparedness and training, emergency response systems, and funding.

ecosystem based disaster risk reduction

At the intersection of disaster risk reduction, climate adaptation, and ecosystem management lies the field of Ecosystem Based Disaster Risk

Reduction (Eco-DRR).³¹ Ecosystems, like life itself, adapt over time to suit their physical circumstances. And while it is a truism that plants and animals only exist where they can exist, it is instructive to look to how nature has ordered itself over millennia, to examine how landscapes bounce back and regenerate, as we strive to create sustainable long-term settlements. For example, there are good reasons that mangrove swamps, salt marshes, and oyster reefs, rather than aspen forests, rim the Gulf coastline from Florida to Texas—or did, until recently. Those flora and fauna, in addition to being able to thrive in that environment, actually create a physical buffer that shields inland regions from storm surges and other impacts of hurricanes, literally shaping the physical contours of the region and helping to determine what other species can inhabit that space. Preserving large-scale native habitats should always be our first priority, not

least because of these lands' importance to wildlife and, often in the case of such habitats as forest and grassland, greenhouse gas absorption. Where this is impossible (i.e., in already-urbanized settings), development must account for the ecosystem services, such as flood control, that the natural environment provides. **We cannot replicate the complex structure of a mangrove forest or wetland in a densely developed area, but investing in permeable pavements, green space, and other water-retentive practices can help to reduce runoff and make urban environments safer during a high-precipitation event.** In areas that currently provide these ecosystem services, but where future development is predicted, steps should be taken to acquire land for conservation purposes, for example by putting parcels under easement, to ensure stability in the system. Where possible, land already developed should be evaluated for conversion to a more natural state—for example, in active floodplains or wildfire zones where high insurance premiums (or where coverage is impossible) make rebuilding an unattractive option, and where buy-outs, re-zoning, or (in cautious application) exercise of eminent domain may be worth considering. Beyond urban sprawl and settlement issues, industrial and agricultural methods are an important part of landscape level planning: authorities should take steps to ensure that mining, livestock grazing, timber harvesting and other activities are conducted according to the highest possible environmental standards, so as not to degrade soil and ecosystem resilience. One of the greatest "natural" disasters in American history, the Dust Bowl, was in fact set in motion by regionally-inappropriate land management practices.³² Modelling and research can help us understand an area's specific ecological context—both historical and projected—and help to minimize such mistakes in the future through proper land use and land cover decisions. The need here is unmistakable: Croplands comprise

about one-fifth of the US—396 million acres³³—making agricultural practices a cornerstone component of landscape level planning. In many regions, including the Corn Belt of central and upper midwestern states, climate change is contributing to wetter conditions: the calendar year that ran from May 2018 to April 2019 was the United States' wettest on record³⁴ and all of that precipitation increases the destructive effects of flooding, as seen along the Mississippi River and its tributaries in spring and summer 2019.³⁵ Partly in response to these threats, farmers and researchers are expanding the use of "cover crops," developing new crops that absorb water year-round, improving planting methods like no-till and strip-till (which disturb the soil less than conventional methods), and implementing other conservation practices to improve soil health and integrity. Federal and state governments should incentivize such practices and fund a great deal more R&D of agricultural systems that are resilient to flooding and drought.

disaster-resistant construction methods

Historically, cities and towns in the United States, as elsewhere, have tended to proliferate along rivers, coasts, and other geographic features that are prone to extreme weather events. Major urban centers on the West Coast (San Francisco, Los Angeles), midcontinent (St. Louis, Memphis), and East Coast (New York) lie atop or near geologic fault lines. The resources simply do not exist to redesign our settlements from the ground up, but disaster-resistant design principles should be incorporated into construction codes and voluntarily adopted by builders, whether for new structures, renovations, or repairs. And when an extreme weather event, earthquake, or other catastrophe causes structural damage, those lessons should be deployed in the rebuilding phase.

safe havens

As different areas around the country become exposed to new or higher-frequency/higher-intensity extreme weather events, it will be vital to build accessible areas of refuge for humans and animals. Areas of refuge (in contrast to longer-term shelters) are intended for short term use during an emergency, such as a hardened secure room that can protect occupants from a tornado. IFAW has field-tested landscape modifications that serve this function in other countries. During Myanmar's particularly devastating 2015 monsoon season, many livestock drowned for lack of higher elevation refuges. IFAW, in partnership with citizens and local agencies, constructed a series of earthen platforms in the Hinthada District, an area where villages are dangerously situated between two rivers. These platforms allow animals to find temporary safe harbor, preserving a key cog in the subsistence of the villages.³⁶ Not every area of refuge is right for every type of disaster, so it is important to have redundancies and plan ahead for the changing geophysical context of each region.

◀ IFAW responder Barb Davis conducts an animal search and rescue assignment in the aftermath of Hurricane Dorian.

²⁹ <https://nca2014.globalchange.gov/report/sectors/land-use-and-land-cover-change#graphic-16879>

³⁰ <https://www.asla.org/resilientdesign.aspx>

³¹ <https://www.iucn.org/theme/ecosystem-management/our-work/environment-and-disasters/eco-drr-what-are-iucns-solutions>

³² <https://www.sciencedirect.com/science/article/abs/pii/S1875963715000798>

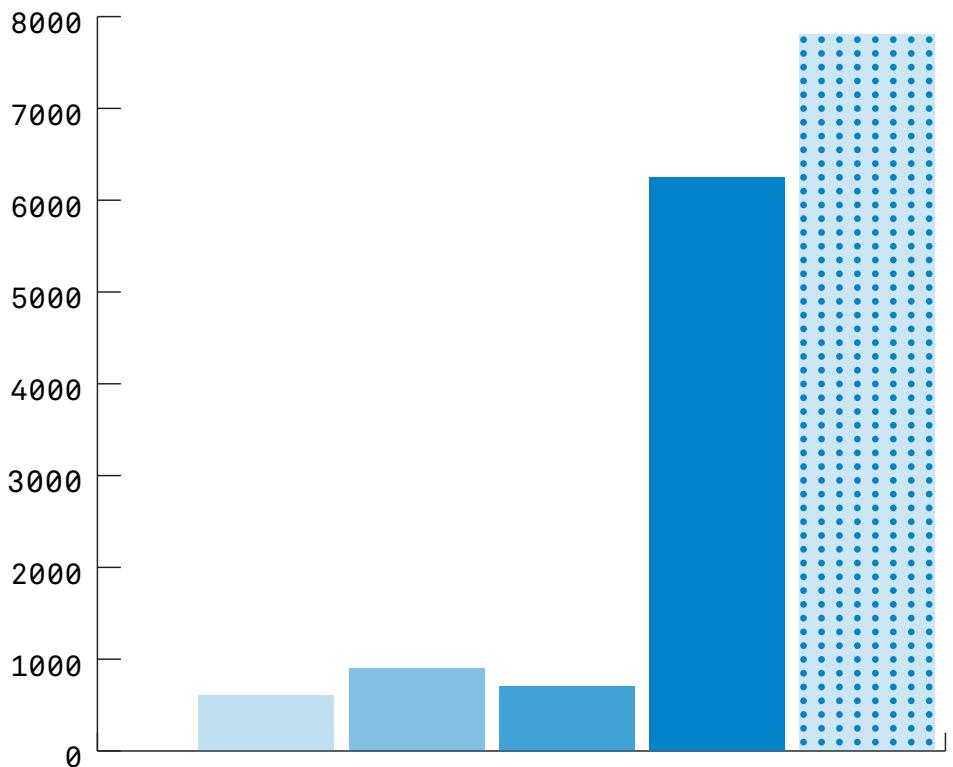
³³ https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/st99_1_0007_0008.pdf

³⁴ <https://www.cnn.com/2019/05/30/us/wettest-12-months-continental-us-wxc-trnd/index.html>

³⁵ <https://weather.com/news/weather/news/2019-05-14-one-of-longest-lived-mississippi-river-floods-since-great-flood-1927>

³⁶ <https://www.ifaw.org/united-states/news/higher-ground-disaster-prevention-myanmar>

building loss by fires at California Wildland-Urban interfaces⁴⁰



settlement planning

The years preceding publication of this report have given us plenty of stark examples proving that where we build matters more than how we build. To take just two examples: the devastating flooding of greater Houston, Texas during Hurricane Harvey was exacerbated by development on floodplains; despite this, city officials continue to issue new permits to build in these high-risk areas, and the federal Department of Housing and Urban Development continues to subsidize housing for low-income renters in floodplains.^{37,38} Two thousand miles west and two years later, the Camp Fire wiped out most of Paradise, California. Paradise, like a third of California's housing stock, exists in the "wildland-urban interface" where rural or exurban

development meets nature.³⁹ The obvious draw of communities surrounded by woodlands elides the fact that these same trees are fuel for wildfires under certain conditions; meanwhile, preventive techniques that work in more remote areas, such as controlled burns, are often not an option closer to developed areas, leading to the accumulation over time of flammable undergrowth.

Authorities can help to minimize future damage by incentivizing urban density instead of sprawl (with consideration given to the urban heat island effect and permeability), giving low-income families safer housing options, and strictly examining new development according to climate models that more accurately predict the "new normal" (rather than continuing to rely on outdated

planning tools). Location matters above all. If we build in fire-prone areas, homes will burn; if we build in floodplains and near shorelines, homes will flood.

Sea level rise was a significant contributing factor to the massive flooding that occurred during Hurricane Florence, causing some 11,000 more homes to be flooded than otherwise would have occurred.⁴¹ North Carolina legislators passed a bill in 2012 that essentially repudiated state scientists' own analysis of sea level rise, preventing it from being used for coastal planning purposes.⁴² Without resorting to counter-factuals, it is still fair to say that such head-in-the-sand policies must be rejected at all levels.

preparedness and training

According to the Michigan State University Animal Legal & Historical Center, as of 2016 over thirty states and the District of Columbia had passed laws or emergency operation plans covering animal evacuation, rescue, and recovery.⁴³

Such laws and regulations are necessary first steps, and all states should have them in place by now, but as the boxer Mike Tyson famously said, "Everybody has a plan until they get punched in the mouth."⁴⁴ What differentiates a successful disaster response from a fiasco usually isn't the plan itself, but the amount of practice that goes into each element, from establishing trust between government agencies and other stakeholders, to executing search and rescue operations in difficult conditions. Most of these are things that we can train for, and when nature lands its punch we will be better conditioned to respond effectively.

a. MOUs

IFAW and other members of NARSC operate on an "invitation-only" basis, wherein a federal, state, or municipal agency must request help through a formal request as part of their incident command structure. Memoranda of Understanding (MOUs) are the means by which we establish preliminary guidelines and expectations for this relationship, and help to build a record of collaboration between these agencies and our team, so that quick intervention is possible when time is most valuable. Over decades of service, IFAW has signed MOUs with several Authorities Having Jurisdiction (AHJ) in the U.S., and will oversee coordination of animal relief efforts in the event of disasters there. IFAW strongly encourages all AHJs to develop MOUs with our team or with NARSC in order to benefit from our expertise and resources.

b. overhead disaster management

Knowledge is power, and the most-requested item in IFAW's toolbox is our subject matter expertise on how communities can best implement disaster management strategies. This encompasses a risk/gap analysis tailored to specific local or regional risks, a look at the resources available (for instance, NGOs that serve the area's animals and/or public health), pertinent legislation or regulations, and much more.

c. training programs

IFAW endeavors to provide disaster-specific and culturally relevant training, and we employ team members to educate responders in a wide array of skill sets: logistics, planning, overhead management, animal care and control, veterinary care, media/public information, and technical animal search and rescue, among others.

d. coordination plans

There are authorities at every level responsible for the care and control of animals, but a pervasive problem all over the US is that these authorities have few methods for planning and working together, and this results in huge gaps in information and on-the-ground efficacy during a disaster. States, municipalities, and federal agencies need to invest more time and resources into developing communications and coordination elements that can be incorporated into overall disaster response plans.

emergency response systems

Once a flood, wildfire, or earthquake hits, it is essential that capacity exists to implement plans.

a. The National Alliance of State Animal and Agricultural Emergency Programs

(NASAEP) provides an extensive description of best practices on such topics as animal decontamination, evacuation, sheltering, veterinary care, and more; we strongly encourage planners to make use of this valuable resource.⁴⁵

b. Animal Search and Rescue (ASAR)

Trained responders from NGOs and government agencies can make a huge impact in the immediate fallout from a disaster. These professionals locate and extract trapped or imperiled animals, and often can stabilize the animal for transport to veterinary care.

³⁷ <https://www.houstonchronicle.com/news/houston-texas/houston/article/Even-after-Harvey-Houston-keeps-adding-new-homes-13285865.php>

³⁸ <https://www.nytimes.com/2019/04/11/us/houston-flooding.html?action=click&module=News&pgtype=Homepage>

³⁹ ilvis.forest.wisc.edu/GeoData/WUI_cp12/WUI_change_1990_2010_State_Stats_Report.pdf

⁴⁰ <https://nca2014.globalchange.gov/report/sectors/land-use-and-land-cover-change#graphic-16879>

⁴¹ <https://wwwaxios.com/sea-level-rise-hurricane-florence-coastal-flooding-a32d013f-5b66-470a-9536-7a54c3001d64.html>

⁴² <https://www.newsobserver.com/news/local/article218287205.html>

⁴³ <https://www.animallaw.info/content/map-states-disaster-planning-laws>

⁴⁴ <https://www.sun-sentinel.com/sports/fl-xpm-2012-11-09-sfl-mike Tyson-explains-one-of-his-most-famous-quotes-20121109-story.html>

⁴⁵ <http://www.cfsph.iastate.edu/Emergency-Response/bpwg.php>

advice for owners

We all want our pets to be safe from harm, and by taking a few precautions we can give them a better chance to survive a disaster.⁵¹

1. Microchip your pet and register the information with a national database.
2. Keep an emergency evacuation kit for your pet that includes medications, vaccination records, food and water, and a pet collar with an ID tag.
3. Have a transport and sheltering kennel/carrier on hand.
4. Contact your local emergency management agency for a list of pet-friendly hotels or shelters that allow co-location with animals. Agencies in high-risk disaster zones may also provide pre-registration for residents who need transportation during an emergency evacuation.*

*Please be aware that protocols have changed due to COVID-19 so please inquire ahead of time.



c. Animal intake

Animals brought to a rescue or shelter facility during a disaster may be experiencing severe psychological or physical distress, and (if injured, contaminated, or aggressive) may pose a danger to themselves or others. It is imperative that handlers are equipped with the necessary skills and tools, including personal protection equipment, to deal with a variety of species and situations. Wherever possible, shelter operators and search and rescue specialists should use standardized tracking and identification systems in order to protect the identity of the animals in their care.

d. Supply chains and systems

Built-in redundancies can sharply reduce the risks posed by the loss of critical equipment like medical supplies and communications technology. Response plans should also ensure that caches of these materials are available at numerous sites in and near disaster-prone

areas. The same principle applies to the systems that underlie a response; as the National Institute of Building Science stresses, "In evaluating required critical infrastructure needs, a balance must be struck between on-site (stand-alone) resilience, and off-site (community-based) resilience needed to support survivability and post-event response and recovery for each building."⁴⁶ In the animal welfare context, establishing regional shelter networks—where out-of-town or out-of-state animal shelters agree to take in pets and unowned animals displaced by a disaster—can reduce the pressures on responders to find last-minute housing for these animals.

funding

Even a minor natural disaster can be wildly expensive, when accounting for deployment of responders, rescue supplies, operating temporary shelters, and myriad other costs.

- a. Disasters can escalate quickly. As can the funding needed to rescue and repair. Independently planning for the unthinkable within household financial budgeting is best practice where possible.
- b. States and municipalities should take advantage of federal rules that allow volunteer services and other donated resources to offset the financial burden of a disaster response effort.⁴⁷
- c. Money influences our decisions about where and how to build. Federal initiatives like the National Flood Insurance Program should be better structured to disincentivize risky growth in disaster-prone areas. Risk models should be regularly updated to account for the impacts of climate change.
- d. Landscape adaptation projects, done right, can be a cost-effective means of mitigating natural disasters and provide numerous

co-benefits for people and animals. To the greatest extent possible, disaster prevention funding should be provided for those purposes rather than hardening infrastructure.

- e. Under the federal "Livestock Indemnity Program" (LIP)⁴⁸ the US government provides financial relief to owners of livestock and poultry that perish in natural disasters, like the 5,500 hogs and 3.5 million chickens and turkeys killed in the Carolinas by Hurricane Florence in 2018.⁴⁹ This program is intended to help stabilize our agricultural systems by defraying the cost burden on livestock farmers, but it also poses a moral hazard: Owners of such operations may choose to take a payout rather than providing for the safety of their animals during a disaster. The government should tie LIP benefits to reasonable preventive standards, based on methods such
- f. We should significantly increase funding of impactful programs like the USDA's Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), and other government initiatives that protect sensitive land or promote conservation practices on "working lands." We should also prioritize on-the-ground monitoring of these programs to ensure compliance by landholders. Research and development of "continuous living cover" crops that increase the resiliency of agricultural lands must be accelerated.

▲ A tired and injured kitten receives veterinary treatment during IFAW's deployment to the North Complex Fire in Butte County, California.

◀ Rescued dog, "Panda", receives a bath to treat her irritated skin during IFAW's deployment to the North Complex Fire in Butte County, California.

⁴⁶ <http://www.wbdg.org/design-objectives/secure-safe/natural-hazards-mitigation>

⁴⁷ https://www.fema.gov/media-library-data/1530129122565-bbfdac5b88fffc3d7c59befce5593c993/Donated_Resources_Policy_2018_508.pdf

⁴⁸ https://www.fsa.usda.gov/Assets/USDA-FSA-Public-usdafiles/FactSheets/2019/livestock_indeemnity_program-fact_sheet.pdf

⁴⁹ <https://www.newsobserver.com/news/local/article218610365.html>

⁵⁰ <https://nfu.org/2018/03/19/what-should-farmers-know-about-climate-change-livestock-indemnity-program/>

⁵¹ Most taken from NASAEEP "Animal Evacuation and Transportation Best Practices," <http://www.cfsph.iastate.edu/Emergency-Response/bpwg.php>



conclusion

Animals are inseparable, in so many ways, from our experience of what it means to be a human. As we prepare for and respond to disasters, the safety and wellbeing of animals must be a key consideration. Sadly, with some notable exceptions, and despite the tireless efforts of many dedicated individuals and organizations like IFAW, we are fighting an uphill battle against the forces of nature and societal inertia.

This report demonstrates how disaster management is an ongoing and many-layered exercise, where it is impossible to fully control outcomes but where there exist countless paths to making a meaningful difference for individuals and communities. These

include such long-term solutions as landscape conservation, climate adaptation, and joint agency planning, and 'just-in-time' training to quickly and safely expand responder capacity. As a nation we need to scale up from our personal preparedness measures to functional systems in every strata of government. It is up to all of us to provide the funds, laws, but most importantly the will to prepare and respond to disasters, and to do it again and again, year after year, one safe family and one safe animal at a time. Resiliency and planning will save lives. We must be ready.

▲ Responders carry rescued animals to shelter during IFAW's Hurricane Florence response.

preparedness, resiliency and planning



safer animals before, during and following a disaster.

International Fund
for Animal Welfare

Beyond Rescue:
Animals in Disaster.
IFAW US Disaster Response
Report.

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