Storms on the Horizon
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Future WAZA Conferences

2019: Fundación Temaikèn, Buenos Aires, Argentina – 3-7 November 2019
2020: San Diego Zoo, San Diego, USA
2021: Moscow Zoo, Moscow, Russia
2022: Loro Parque, Tenerife, Canary Islands

Cover photo:
Chase O’Brien of San Antonio Zoo assists in the evacuation of animals at the Texas Zoo, moving animals from their flooded location to a shelter in town, on Thursday 31 August 2017.
© Houston Zoo

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Relocating Tasmanian devils is difficult on a good day. In extreme weather conditions, with temperatures over 40 °C and wind over 100 km/hr, it is inconceivable. This is exactly the situation faced by keepers at Healesville Sanctuary, Australia on Saturday 7 February 2009. With bushfires raging throughout the state emergency services were stretched thinly. Fires encircled the Sanctuary, at one point coming within 2 km. A lookout was posted up on the water tower, watching for smoke or spotting fires as flaming embers landed within the grounds. Sprinklers flooded enclosures battling to wet down the vegetation.

The decision was taken to evacuate the animals. Absolutely heartbreaking choices had to be made, who to take and who to leave behind? With Melbourne Zoo and Werribee Open Range Zoo only hours away, many of the charismatic animals were relocated – koala to Melbourne and dingo to Werribee. But the threatened species caused the most debate. Relocating could interrupt breeding and jeopardise a season of offspring, however the alternative could risk losing the entire population.

The decisions that we have to take in times of disaster or emergency situations reflect the larger dilemmas that face zoos and aquariums. We work with individuals, taking decisions about every aspect of their lives, yet we must also work at a global scale to protect species and large populations. We must make choices, even when all species need our help.

This edition of WAZA News, covers emergencies and disasters. The stories are confronting and remind us of the huge responsibility we carry, as we choose to hold animals in human care. Yet these events also demonstrate the enormity of human capacity for bravery, compassion and kindness.

In the days following ‘Black Saturday’ we were inundated with help, funds and sick animals. Our community rose to the challenge and stood by us during a terrible time. Our vets worked overtime, treating animals severely burnt in the fires, often having no option but to allow for a quick death. Staff opened their homes to colleagues and to recovering patients.

As we face the dawning reality of a warming planet, extreme weather events will become more common. Today the temperature in Melbourne is forecast to exceed 43 °C. We are as ready as we can be, but probably not as ready as we need to be.

I hope these stories will inspire you, and remind you to dust off your business continuity plan, continually refresh your staff training, and make sure that your equipment is all in working order.

We don’t know when or where the next disaster will strike. We just know that it will.
Natural Disasters and the Art of Doomsday Prepping

There has been a noticeable increased trend in the occurrence of recorded global natural disaster events since the beginning of the 20th century, with a significant acceleration in occurrences of natural disasters since the 1970s. This growing trend could be due to an increase in recordings and advances in technology and communication tools, but it has also been attributed to climate change. As these weather events escalate in intensity and frequency, zoos and aquariums need to be prepared for any eventuality.

Many regional and national zoo and aquarium associations now require their members to create disaster preparedness plans, and some practice training drills in coordination with local fire and emergency crews. Others have advanced protocols with nearby institutions so that animals that do have to be evacuated can be relocated as quickly and calmly as possible. Human ingenuity is often at its best in a crisis, and the dedicated staff at WAZA member zoos and aquariums have proven this time and time again as they rescue and protect animals under the harshest of conditions.

Storms on the Horizon

Andreas Ambarchian
Freelance Writer

Fire crews could not yet see the vicious inferno; however, swollen clouds of charred smoke emanating from nearby hills were an ominous sign that the flames were closing in. With this imminent threat looming, little option remained but to initiate emergency procedures.

This scene took place near Los Angeles Zoo last year early on the morning of 9 November. A huge wildfire, fuelled by sundried scrubland, raged through Griffith Park. The blaze was contained before it reached the zoo but remained a potent display of the ferocious power of natural disasters.

The zoological community is well acquainted with the might of Mother Nature. Just months before the blaze in L. A., Virginia Zoo was hit by Hurricane Florence and, in December 2017, Christmas preparations at Santa Barbara Zoo were delayed as the massive Thomas Fire blazed a trail of destruction through the county.

Meanwhile in 2011, Japan’s Aquamarine Fukushima was shaken by a 9.0 magnitude earthquake, the largest ever recorded in the country. The aquarium was then battered by the subsequent 6-metre-high tsunami.

The significance and frequency of the threat posed by natural disasters to the zoological community is not lost on the American industry’s regulating body, the Association of Zoos and Aquariums (AZA). Any zoological facility seeking AZA accreditation is required to establish a set of rigorous risk management strategies.

AZA also obligates its members to perform at least four environmental- and weather-related emergency drills per year. The drills must be recorded and the results evaluated. Any aspects of the emergency response requiring improvement are identified and modified, while those deemed adequate are reinforced. The European Association of Zoos and Aquariums (EAZA) during its accreditation screenings requires evidence of planning for emergencies of all kinds.

Another key element of an effective disaster response strategy is location specific planning, Prague Zoo Director Miroslav Bobek explains: “Every zoo should be prepared for natural disasters that are particular to their given locality. For instance, the Prague Zoo grounds are partly located very close to Vitava River so having a detailed flood plan in place is crucial for us.”

Mr Bobek continues: “We keep a number of transport boxes, wooden boxes and crates ready in case of an emergency, as well as the corresponding amount of anaesthetics. Animals that are difficult to move, we keep in the upper part of the zoo grounds.”

A facility may also have provisions in place for the eventuality that public infrastructure is damaged during a natural disaster, Dr Andrea Caiozzi from the National Zoo of Chile in Santiago says: “At the zoo we have a huge generator that can provide enough energy to power a little town, so electricity is not a problem for us. We also have access to a large water tank that can give us several days’ worth of water supplies.”
When a natural disaster strikes, a facility must elect whether to evacuate or keep the animals on site. The final decision is based on a number of factors, including the degree of difficulty required to transport an animal and whether the use of anaesthesia is needed or not.

Evacuation removes zoo wildlife from the eye of the storm but the process can be extremely complicated. Moving large animals, such as elephants and giraffes, is impractical and may take days; time not always available during an emergency situation. Moreover, animals can suffer life-threatening stress during relocation.

Because of these difficulties, many facilities prefer to batten down the hatches and stay put. This was the recourse taken by Zoo Miami in 1992. Under siege from Hurricane Andrew, a flock of more than 50 Caribbean flamingos were shepherded by zoo staff from the birds’ exposed enclosure to the sheltered safety of the male toilets. It proved such a successful strategy that six years later, when the zoo was hit by Hurricane George, the process was repeated.
Similarly, in 2017 when Hurricane Harvey ploughed into Southeast Texas, Houston Zoo decided to sit tight. Lee Ehmke, President and CEO of the zoo, recalls: “Throughout the storm, our animals were safe and secure in their barns and night houses. They were cared for by a dedicated crew of team members who stayed at the zoo for the duration of the seven-day weather event.”

Excellent execution of emergency procedures, coupled with the stoic commitment of staff, ensured that Houston Zoo sustained only minor storm-related flooding and fallen tree limbs, but no significant damage. Other areas of Texas were not so fortunate: the homes of many Houston Zoo team members were left in tatters by Hurricane Harvey, one of the costliest tropical cyclones on record.

Regardless of a facility’s contingency planning, sometimes the power of a disaster can be overwhelming. During severe flooding in 2002, Prague Zoo sadly lost several animals to the deluge, including an elephant, hippopotamus and gorilla. The disaster has since been categorised as a 500-year flood, a phenomenon against which it is exceedingly difficult to protect facilities from, regardless of the disaster response strategy.

Worryingly, Mr Bobek says that climate change could render such events commonplace in the future: “Given the forecast provided by climatologists, it is very likely that we are going to experience more crisis situations of the magnitude of the flood of 2002.” Dr Caiozzi from the National Zoo of Chile concurs: “There is no doubt that because of climate change these massive disasters have started to occur more frequently over the last few years. They used to be uncommon but now they are super-common.”

Number of reported natural disasters from 1900—2018

Number of recorded global natural disaster events from 1900 to 2018. The natural disasters included in this graph are those caused by floods, droughts, extreme temperature, extreme weather, landslides, dry mass movements, earthquakes, volcanic activity and wildfires.

Source: EMDAT (2019) in ourworldindata.org
To battle climate change, zoos and aquariums will need to develop more robust disaster defences, such as safe-buildings and enhanced infrastructures that are able to withstand a range of emergency situations, including wildfires, hurricanes and floods. Additionally, constant vigilance will be crucial, Houston Zoo’s Mr Ehmke explains: “As the intensity and frequency of these types of weather events continues, preparedness becomes even more important.”

During an environmental emergency, the wider zoological industry often comes to the aid of an afflicted facility. When Hurricane Katrina hit the Deep South in 2005, Houston Zoo provided staff to help the Audubon facility in New Orleans; when Tbilisi Zoo was inundated by floods in 2015, Prague Zoo delivered an experienced rescue team to aid the stricken zoo; and when Aquamarine Fukushima was reeling from its double salvo of disasters, Kamogawa Sea World helped to assist the aquarium with the rescue of its marine mammals and sea birds. In the face of an increasingly tempestuous climate, such inter-facility collaboration and support will become more vital than ever.

Above all else, Dr Caiozzi says that the zoological community must lead the charge in trying to turn the tide on climate change: “The biggest mission of zoos and aquariums is to help people to understand that natural disasters are our responsibility because humans are creating climate change. We have to make people aware that everyone can make a difference and encourage them to adopt more environmentally friendly behaviours, like composting at home, reducing waste and not using single-use plastic.”

Dr Caiozzi concludes: “Everyone can help the elephants in Africa; you don’t have to be in Africa to help them. You don’t have to be in Chile to help the Darwin frog. We can all contribute.”
Wildfire — Santa Barbara Zoo

Adrià Lizanda
Freelance writer

The staff at the Santa Barbara Zoo in California watched in horror as the flames and smoke of the Thomas wildfire rapidly encroached upon their facilities in December 2018. The staff were prepared and ready to evacuate the animals as a result of the Risk Management Plan they had put in place. As Zoo Director Nancy Mc Toldridge explains: “With this wildfire, there was enough time to convene our Emergency Response Team”. Although the fire did not hit the zoo, the facilities had to close for days due to poor air quality caused by smoke brought in by strong winds. It reached the stage where the ‘ash and smoke plan’ had to be implemented: some animals were moved to enclosed holding areas and large animals like elephants were given access to indoor spaces so they could avoid the smoke fumes and ash.

Mc Toldridge explains that large animals like elephants and giraffes could not be evacuated: “The stress on the animals would be enormous”, she says. “When they are moved, it takes weeks of preparation for them to adapt.” As a result of one of the recommendations of the Risk Management Plan, sand and dirt surrounding their holding areas protected them from the fire, so they were not in danger at any time. Help from other zoos was overwhelming – Los Angeles Zoo set aside an entire parking lot in case space was required for evacuated animals and Safari West wildlife reserve offered the use of their giraffe trailer all the way from Santa Rosa to assist in an evacuation scenario.

↑↑ Keepers crate small animals and birds, like these tawny frogmouths, for safekeeping in the Santa Barbara Zoo’s Discovery Pavilion.

† The Santa Barbara Zoo remained closed for several days to clean up following the Thomas Fire emergency.

© Santa Barbara Zoo (both photos)
In 1992, when Hurricane Andrew bore down on the zoo, staff herded more than 50 Caribbean flamingos into the safest room available, which happened to be the men’s restroom. Nearly 30 years after the event, Ron Magill still receives numerous requests for this iconic photo.

© Ron Magill

Hurricane Irma blew over a large ficus tree in the hyena exhibit, where it remains to this day. “The fallen tree serves as a reminder of the power of hurricanes and as a historical landmark recognising Zoo Miami surviving Hurricane Irma,” said Ron Magill, Zoo Miami Goodwill Ambassador and Communications Director. © Ron Magill
Prague Zoo’s proximity to the Vltava river means it is a sitting duck when waters rise. In the past 20 years the zoo has suffered two severe floods, one in 2002 and another 11 years later in 2013. Recovering from the first flood cost the zoo €6.5 million in damages and repairs, while the second flood racked up another €2 million in costs.

“We simply need to be prepared,” Miroslav Bobek, the Director of Prague Zoo explains, essential supplies are always at the ready in case disaster strikes. Animals are also strategically located within the zoo. Animals such as elephants and hippos which are more difficult to relocate, are kept on the higher levels of the zoo to keep them out of the way of possible flood waters. Decisions are made in advance on which species to evacuate. In 2013 all animals except for a few birds and local species like rabbits were sent to other facilities.
A hippopotamus peeks out the window to survey the flood waters. A rhinoceros is transported to a safe location, 2002. © Prague Zoo (both photos)
Prague Zoo, pavilion of primates after flooding in 2013. The water at its highest point highlighted. © Vladimír Motýčka

→ Flood waters surrounding the zoo in 2002. © Prague Zoo

Prague Zoo views dealing with natural disasters as a matter of collaboration. Back in 2013 zoos from across the country assisted Prague zoo with the evacuation of animals and their aftercare. Civic help was also important, with visitors and friends of the zoo rolling up their sleeves to help.
When the largest fault slip on record occurred off the coast of Japan on 11 March 2011, the subsequent magnitude 9.0 earthquake and 6-metre tsunami resulted in the loss of tens of thousands of lives. Among those lost were thousands of endangered aquatic animals at Aquamarine Fukushima, an aquarium located on the cusp of a nearly uninterrupted string of tectonic activity called the ‘Ring of Fire’.

Upon impact of the earthquake, the aquarium’s first move was to guide visitors away from the building so that when the tsunami came crashing down an hour later the only people left were the eighty staff members and volunteers who stayed behind to protect the animals and their facility. The slip collapsed the surrounding landfill area, burst pipes, and catapulted the swell of seawater at Japan’s coast that consequently submerged the basement and wrecked the electrical system.

The electricity and water supply were interrupted throughout the city for weeks, which proved to be the most lethal hazard for the aquarium. 80 of the facilities tanks supported fish life with a home generator-powered air blower and although this could run on oil the facility had too short a supply to save the thousands of fish, tuna, sardines, and endangered Napoleon wrasse in their care.

With atomic power plants located 55km away, immediate local relief efforts had to focus on preventing an escalation, rather than aiding survivors. Thankfully, in a rush of support from the zoo and aquarium community, Kamogawa Sea World, Ueno Zoo, Tokyo Sea Life Park, Mito Sea Paradise, and New Enoshima Aquarium came to the rescue of the surviving animals, which included marine mammals, river otters, and sea birds.
The Fukushima Daiichi Nuclear Power Plant was incapable of withstanding the earthquake and 15-metre tsunami which disabled the power supply and cooling of three reactors causing a nuclear accident. The power plant emitted dangerously high levels of radiation in the area, a crisis that was measured at Level 7 event classification – the highest on the international scale for nuclear incidents and the same level assigned to the 1986 disaster at Chernobyl in the Ukraine. In combination with the destruction caused by the earthquake and tsunami this was enough to deter visitors to the region for an extended period of time, which further slowed Aquamarine’s recovery.

Now that the aquarium is fully restored, a research team actively monitors radiation levels of fish and seawater in the area and publish their findings for the benefit of residents’ health and safety. Scientists’ improved understanding of the devastating effects of radiation in the oceans will contribute to the recovery process following the nuclear disaster.

The Monterey Bay Aquarium, Aquamarine Fukushima’s sister institution, also helped relief efforts with a $25,000 donation. Additionally, their own conservation research programme manager, Chuck Farwell, made many supportive visits in the disaster’s aftermath. It took until May to complete the bulk of the clean-up and staff worked on restocking and repairing the facility literally up until the last minute prior to the reopening in July 2011.

In 1995 the Hanshin-Awaji earthquake resulted in major damage to four zoos and one aquarium located in the Kansai Area in Japan. As a result of this earthquake, the Japanese Association of Zoos and Aquariums (JAZA) began to develop an emergency support system to respond to institutions in crisis. JAZA then formed the Risk Management Division in 2006 and the division actively engaged in the aftermath of the Tōhoku earthquake and tsunami in 2011. Six JAZA member institutions were severely impacted by the earthquake and suffered significant damage, especially Aquamarine Fukushima. The Risk Management Division was later reorganised to become the Risk Management Committee (Emergency Committee) in 2012. The committee provides support to Japanese zoos and aquariums which have been impacted by natural disasters, by sending food, helping to transfer animals to other institutions, and setting up fundraising campaigns as well as providing any other support the institutions may require.
Flooding and Wildfires in Chile — National Zoo of Chile

Caitlin Ball
WAZA

Situated in the foothills of Parque Metropolitano, the National Zoo of Chile (Zoológico Nacional de Chile) is protected against and prepared for an array of natural disasters. The 93-year-old institution is at the forefront of the nation’s relief efforts, rehabilitating more than 700 new animals each year. It has witnessed countless earthquakes, but only in the last few years has it begun to see frequent and devastating floods and fires. With a long history of disaster response, the zoo has developed its expertise to meet the needs of Chile’s communities and biodiversity in the face of climate change.

Many lives were lost in April 2015 when floods shocked the desert in the north of Chile, but many lives were also saved. When the disaster struck, the zoo reached out to the national authority for wildlife to offer their assistance, as per procedure. In no time, three veterinarians and two senior keepers set out with a multitude of supplies on a 20-hour drive north where they spent a week camping in a school, treating every injured animal they could, both wild and domestic.

Nearly two years later, the National Zoo of Chile provided critical disaster response support again when a series of wildfires raged across the country. As the fires escalated in a region 500 kilometres south of Santiago it became apparent that help was needed on site because many animals, like the near-threatened pudu antelope, would be killed by the stress of transportation. The zoo called the national authority for wildlife on a Monday afternoon to offer their assistance and by Wednesday morning their team had arrived with enough resources to set up a campsite hospital so sophisticated they were even equipped to do surgery if needed.

↑ April 2015, flooding in Copiapó: zoo visitors donated bottles of water to support the disaster rescue campaign in the region.
© National Zoo of Chile

↑ Jan 2017, wildfires in Rancagua: National Zoo of Chile conducted an emergency rescue campaign for the endemic and highly endangered lizard Liolaemus confusus.
© National Zoo of Chile
While the zoo pulled together this massive project, countless people and organisations, from NGOs to individual veterinarians, reached out to offer their help. Reflecting back on the experience, Dr Andrea Caiozzi, General Curator of the National Zoo of Chile said, “I really need to stress that it’s a collaboration with so many people, so many institutions.” Once the team had made contact with and gained the trust of community leaders, such as religious leaders, social workers, and local veterinarians, word about their work spread rapidly and brought in an overwhelming wave of local support.

Though the significant increase in the severity and frequency of natural disasters is a recent development, the National Zoo of Chile has grown used to the work it demands. Through their extensive experience they have learned which teams and tools work best in different scenarios and they are always prepared for swift response. As part of this preparation, zoo staff members maintain a widespread network of experts to call on whenever disaster may strike.

February 2017: Veterinarians from National Zoo of Chile treat wildlife for burn wounds caused by the wildfires. all photos © National Zoo of Chile
Hurricane Harvey

Gavrielle Kirk-Cohen
WAZA

Helping Hands During a Crisis

When Hurricane Harvey tore along the Texas coast in 2017, it brought heavy winds and rain, resulting in severe flooding in the state. The powerful storm, with winds of around 130mph, destroyed buildings, toppled trees, flooded streets and cut off electricity to the city. Torrential rain caused the Guadalupe river to overflow – inundating Texas Zoo with water.

As soon as the storm first hit south Texas, San Antonio Zoo began coordinating a state-wide emergency response effort to provide manpower and resources to zoological facilities affected by the hurricane. While the flood waters rose, Texas Zoo staff were never far from the animals with some of the keepers staying overnight on the roof of the zoo until assistance arrived. A network of Texas zoos and aquariums which had been largely unaffected, quickly came together to deliver relief efforts.

→ Staff from San Antonio Zoo removing trees knocked over by the flood waters.
↓ Staff from San Antonio Zoo help to evacuate animals from the Texas Zoo.
© San Antonio Zoo (both photos)
Teams of volunteers from San Antonio Zoo, Fort Worth Zoo and SeaWorld San Antonio descended upon the city of Victoria to provide aid and assistance to the Texas Zoo, which had sustained significant flood damage. Armed with equipment and supplies, zoo staff took a mile-long boat trip to reach the zoo and worked in waist-deep water to carry animals to safety and remove downed trees and debris. Using airboats provided by Texas Parks and Wildlife, staff from San Antonio Zoo were able to ferry in essential supplies and evacuate smaller animals to a shelter in the city.

As a result of the dedication and commitment of zoo staff and volunteers from the emergency response network, most of the animals were saved, with only one casualty.

Use the camera on your phone to scan the QR code to see how staff from San Antonio Zoo move animals from Texas Zoo to a safe and dry location, using an airboat.

Note: Some Android versions may require an app to scan QR codes.
Black Saturday Fires — Healesville Sanctuary

Caitlin Ball
WAZA

Ten years ago, a record-breaking heatwave preceded bushfires across Australia’s state of Victoria. On 7 February 2009, now infamously known as Black Saturday, bushfires raged out of control for three weeks. By the time the fires had been extinguished 173 people had been killed and 400 injured with 2,000 homes destroyed. In a powerful episode of Zoos Victoria’s new podcast, Fauna, Healesville Sanctuary shares its story from that devastating time.

Healesville Sanctuary found itself in the path of a violent blaze and was forced to make a difficult decision, either stay and risk losing animals to the flames or evacuate and risk losing them to stress. For many of the species cared for at the sanctuary such as the critically endangered orange-bellied parrot stress can be lethal. Evacuations in these conditions are exceptionally hazardous but as the bushfire drew nearer it became clear it was the only option. Additional help arrived at the sanctuary on fire trucks to assist with the complicated five-hour preparation to relocate the animals to Melbourne zoo. Upon arrival at the zoo Healesville staff were met with overwhelming support as many unscheduled employees volunteered their help. The ordeal continued over the following weeks as the sanctuary’s vet hospital received many injured wild animals. Though the destructive power of the fires meant that few animals lived long enough to be attended to. In total, the hospital treated about 200 patients, many of whom were unfortunately beyond saving.

Protecting animals in the wild from natural disasters is an impossible task, but much can be done to safeguard those in human care. Since 2009, Healesville has transformed and honed its emergency response. Detailed, prioritised plans have been put in place with yearly fire drills held and all equipment down to the last screwdriver packed and ready to go. The sanctuary is prepared to execute an orderly, documented evacuation at any moment. Wildfires are a grave danger; the immediate damage and subsequent ripple effects they cause can take decades to recover from.

In the face of climate change’s growing threats, the role zoos and aquariums play in species conservation is more vital than ever.

How Do You Evacuate a Zoo?

Scan the QR code to listen to the Fauna podcast. Hear from keepers and vets, at the Healesville Sanctuary, about what happened on Black Saturday — and how the experience forever changed the way things are done.

Note: Some Android versions may require an app to scan QR codes.
Hurricanes have been significantly intensifying for decades. In 2012, Hurricane Sandy killed 147 people in total. Of those deaths, 72 were in the United States of America, making it the country’s most directly fatal storm since Hurricane Agnes in 1972. With damages nearing US$50 billion, this was the second-costliest storm the US had seen since 1990. The entire city of New York had been anticipating the storm for days. Weather reports indicated it would be serious, so the Wildlife Conservation Society’s (WCS) New York Aquarium, located right on the shoreline of Coney Island, prepared extensively using protocols based on past precedent. As they would soon learn, past precedent cannot prepare for record-breaking events.

As high tide approached on the evening of 29 October 2012, New York Aquarium Director, Jon Forrest Dohlin went out on the boardwalk to check conditions on the beach, expecting the worst. To his relief, surf was not coming far enough up the beach to be a real threat. However, just as high tide peaked, his radio went into overdrive with reports of water pouring into the aquarium. The storm surge had moved past Coney Island beach, into the adjacent Coney Island Creek, and was flooding all of Coney Island from the creek side. He had been gone only 10 minutes, but by the time he returned water levels reached his knees. The sandbags they had placed by doors had no effect whatsoever as water streamed in through ventilation ducts and straight into the basement, where emergency generators, life support, and off-display animals in holding tanks were being housed. “I was really overwhelmed with a feeling of disaster thinking “We’re going to lose the animals here,”’ Dohlin recalls. “Even when the water stopped rising the sense of impending disaster was increasing all the time.”

His first step was to ensure the safety of all 18 staffers who had stayed overnight to ride out the storm. Once everyone reconvened on high ground, they established a command centre on the animal hospital’s second floor, whose rooftop emergency generator was still functioning. With hardlines and cell service down and limited electricity with which to charge radios, staff communicated using hourly updates on whiteboards around the facility. Three or four days passed before anyone from the outside could enter the aquarium and staff remained on the premises working round the clock for about 10 days until immediate dangers were averted.

Due to the aquarium’s prudent planning the vast majority of animals survived. In preparation for the hurricane they had ordered extra oxygen tanks so when the facility lost power they were able to maintain habitat oxygen levels by dropping air stones into the tanks. This foresight saved almost all the indoor animals, even those in the basement. Unfortunately, the school of freshwater koi carp that were awaiting completion of the exhibit’s renovations in temporary outdoor pools were lost to the saltwater floods.

The aquarium closed for seven months following Hurricane Sandy and when it finally reopened it was only operating at 40% of its capacity. Restoration is still ongoing and projected to conclude in 2020. Currently, more than six years later, most staff are still operating out of temporary trailers.

Reflecting on that time, Dohlin emphasises two pieces of advice. First, he warns the zoo and aquarium community, “to not underestimate the significance and the impact of climate change overall and to base their thinking and planning on future scenarios, not past precedent.” In the aquarium’s more than 60 years on Coney Island, nothing of this magnitude had ever happened, but with increasingly volatile weather patterns he fears hurricanes will become a more regular occurrence. Second, he stresses the importance of “robust”, “well drilled”, and “flexible” emergency planning. Flexibility is key because, no matter how prepared the team is, it is impossible to anticipate how the event will unfold. With climate change continuing to escalate, the importance of contingency planning will only grow in our global community.
Flood damage at the New York Aquarium on 1 November, 2012 following Hurricane Sandy.
© Julie Larsen Maher/WCS (both photos)

Scan the code to see an interview with Jon Forrest Dohlin in the immediate aftermath of Hurricane Sandy.

Note: Some Android versions may require an app to scan QR codes.
The Zoo and Aquarium All Hazards Preparedness, Response and Recovery (ZAHP) Fusion Centre works as an activity hub informing the exotic animal industry about how to face natural as well as other kinds of disasters. Founded three years ago, ZAHP has developed several projects to assist the world zoo and aquarium community. Dr Yvonne Nadler, from ZAHP’s Fusion Centre, explains why adopting their planning processes is key for prevention and response to emergencies.

Why was the ZAHP centre created?
The centre was created to work on projects of mutual interest to the exotic animal industry and the United States Department of Agriculture (USDA). So, we have focused on contingency planning for all hazards, with an emphasis on foreign animal disease prevention.

What is the role of ZAHP in the zoo and aquarium community?
We try to better connect facilities with regulatory and response authorities. Since USDA focuses a lot of its efforts on diseases that impact agricultural animals, we work closely with them to inform America’s exotics industry of the policies and procedures that are put in place for disease prevention.

How does ZAHP help zoos and aquariums prepare to face natural disasters or emergencies?
ZAHP has developed materials to assist with the planning processes for all hazards; often organisations have difficulties knowing where to start. Our materials provide a framework, but the responsibility lies with each individual facility to develop its own plans and involve the right individuals to make sure their plans are realistic and achievable.

Is the world’s zoo and aquarium community, in general, sufficiently prepared to overcome natural disasters?
I think the key words here are ‘in general’. ZAHP is not currently tracking exactly which facilities have preparedness plans in place. Certainly, we know that large facilities located in high risk areas prone to hurricanes and floods often have very robust plans in place because they frequently have to implement them. This gives them the opportunity to improve them for the next time. The Fusion Centre does not collect or critique plans, but we do provide the tools and the framework to allow organisations and staff to make the most efficient preparedness plan possible.

As the frequency of natural disasters increases what is the role that ZAHP can play?
We know that sea levels are rising, and storms are becoming fiercer. Our climate is changing. As more powerful storms develop and sea levels rise, facilities that have never been impacted in the past will begin to see effects further inland such as droughts. We challenge those potentially impacted by them to consider alternative water sources. We challenge those in northern areas of the country to determine what they might need to survive power outages or severe snowfalls that shut down whole communities for days. Facilities need to form relationships with first responders and other partners to identify their risks, and then work together on implementing preparedness plans to meet these challenges.
As threats from climate change amplify, members of the global zoo and aquarium community are preparing to meet them. In February of this year, Omaha’s Henry Doorly Zoo and Aquarium hosted a national workshop on disaster preparedness in partnership with the Zoo All Hazards Preparedness, Response, and Recovery (ZAHP) Fusion Centre and the Association of Zoos and Aquariums (AZA). Henry Doorly zoo has a long history of collaboration with ZAHP as well as with local responders, making it an ideal place to trial the formation of an exotic animal response team.

Exotic animal care professionals from across the United States of America attended the workshop which was run by Eric Thompson from Code 3 Associates, an institution of global animal search and rescue team trainers. The workshop covered the fundamentals of disaster response. The zoo’s deployment team will continue training until fully credentialed as an Emergency Management Assistance Compact (EMAC) resource. They will then have the capacity to assist fellow zoos and aquariums in the event of disaster. EMAC is an interstate agreement that allows deployment teams to cross state borders when one state lacks adequate resources to respond to a disaster. As an added benefit, qualifying for EMAC will mean the deployment team has the knowledge to assist Omaha’s own facilities when necessary. While working to finalise its credentials the team will collaborate with professional animal search and rescue groups such as the American Society for the Prevention of Cruelty to Animals and Code 3 Associates to outline skill sets necessary for handling non-domesticated animals in the event of a disaster.

The primary message from the workshop was that the zoo and aquarium community does not need to reinvent the wheel when it comes to disaster response. Exotic animals have specific needs that must be defined and provided for, but many rescue fundamentals are uniform across these situations. Seeking the expertise of disaster response professionals in regards to the explicit requirements of the collection, is an essential approach for preparing the zoo and aquarium community to face climate change’s growing threats.

Omaha’s Henry Doorly Zoo & Aquarium Disaster Response Workshop

Caitlin Ball
WAZA
Together for nature

The 74th WAZA Annual Conference will take place on 3–7 November in Buenos Aires, Argentina and will be hosted by Fundación Temaikèn. Join the world’s leading zoo and aquarium professionals under the theme ‘Together for Nature’ to discuss key issues such as animal welfare, conservation, climate change, plastic pollution, and the future of zoos and aquariums among many more exciting topics.

Fundación Temaikèn is a national organisation encompassing the Temaikèn Biopark, the Temaikèn Reproduction Centre (CRET), and the Osununú Natural Reserve, a 174-hectare jungle reserve. The foundation collaborates with other institutions and communities for research, education, and preservation of species and ecosystems, giving priority to local species. For more information and to register for the conference, please visit the special website:

waza2019.org

Scan the code to see the beautiful biodiversity that awaits you in Argentina.
Earlier this year, WAZA launched a new website that combines ease and efficiency of use with a clean, fresh look that emphasises the association’s commitment to conservation, animal welfare, species management and education.

WAZA worked with the Inzone Design technology company in Barcelona to simplify and modernise the design, as well as making it more intuitive for users to locate relevant information and content.

The website includes a re-designed members’ map, making it easier to locate WAZA institutions around the world, as well as a blog that allows WAZA staff members and supporters to post articles. The website is fully optimised and responsive, which allows it to react and make adjustments based on various factors, most notably screen size. It is designed to be used across all devices, changing images, font sizes, margins and padding, as well as moving elements around to adapt to the user’s screen.

waza.org

The unifying organisation for the world’s leading zoos and aquariums

WAZA is the voice of a global community of high-standard, conservation-based zoos and aquariums and a catalyst for their joint conservation action.

FIND A WAZA MEMBER ZOO OR AQUARIUM
On 30 June, 2018 the Wildlife Conservation Society’s (WCS) New York Aquarium opened the Donald Zucker and Barbara Hrbek Zucker ‘Ocean Wonders: Sharks!’ exhibition. The aquarium’s first major new exhibition in 25 years, the 57,000 ft² space holds over 800,000 gallons of water and more than 115 species. Varieties include sand tiger, blacktip reef and zebra sharks, and also cownose rays. Featuring nine galleries, the exhibition is a testament to the aquarium’s determination to inspire visitors about New York wildlife, shark and ocean conservation at large.

The groundbreaking 150m exhibition had been in development for a decade but the opening day of 2 November 2012 was delayed by the onset of Hurricane Sandy. The hurricane prompted the addition of flood-proofing alterations to the original plans. The entrance to the exhibition was redesigned to meet new floodplain elevations and metal storm doors with inflatable gaskets were installed to create a watertight seal. The aftermath of Sandy proved to be a trying time for the aquarium. New York Aquarium Director Jon Dohlin was quoted as saying: “The fact that we opened this massive new exhibit was just such a great feeling for the aquarium and for our visitors, just to be able to say there is something new here. After all these years of being only partly open, we’ve opened a big, cutting-edge exhibit that really gives people an exciting reason to go visit the aquarium.”

Susan Chin, WCS’s Chief Architect, led the design team in collaboration with Seattle’s Portico Group, New York’s Edelman Sultan Knox Wood, Doyle Partners, and artist Ned Kahn. Designs drew inspiration from the ocean with the exhibition set inside a nautilus shell-shaped pavilion made from precast concrete and encircled by a 1,100-foot ‘shimmer wall’ composed of tens of thousands of aluminum pieces. The nine galleries feature a coral reef tunnel, a shipwreck pulled from local waters, and a 62,000-gallon ‘Discover New York Waters’ display complete with information on shark tagging and interactive panels to educate visitors about species in the neighbourhood. Additionally, a ‘Sharks in Peril’ gallery details their reproductive methods, slow growth rates, vulnerability, and threats, and shows what WCS and others are doing to help.

The facility has received a Leadership in Energy and Environmental Design (LEED) Silver Certification for its water efficiency, energy use, materials, and sustainable design and the New York City Public Design Commission bestowed an Award for Excellence in Design on the project.
View of the outside of Ocean Wonders: Sharks! showcasing the nautilus shell-shaped pavilion.

The new exhibit offers rooftop and boardwalk views of the Atlantic ocean.

© Julie Larsen Maher/WCS (both photos)
The exhibit has a strong educational and engagement component. Stations posted throughout the galleries allow guests to submit their email addresses to follow conservation programmes and there are numerous pledge stations at which visitors can commit to a sustainability practice, such as limiting consumption of single-use plastics. This culminates in an ‘Ocean Advocates’ digital magazine cover, complete with the visitor’s portrait superimposed inside scuba gear and a list of pledges the visitor made during their visit. As the covers are created, they are displayed on a screen alongside other visitors’ covers. “One person changing their habits may not have a huge impact, but the real win is when we look at it in the aggregate,” says Dohlin, “and that’s what you see up on that screen when you realise everybody else that came through the exhibit also wants to make those changes.” Sharks! has attracted thousands upon thousands of pledges. “That’s the most exciting part of the exhibit from my standpoint,” Dohlin says, “we are gathering together a really powerful group of advocates who have self-identified as caring about these issues.”

Dohlin feels that the two most influential galleries are Conservation Choices and the one located immediately before it, Hudson Canyon’s Edge. Throughout the exhibition there are reminders of New York’s vast biodiversity, but the grandeur of Canyon’s Edge truly impresses a sense of ownership because it is a reminder that in order to find nature New Yorkers need not go further than their city’s coast. “If you’re a kid from New York… and the message to you is ‘this is yours to protect, this is your heritage’… that’s a really powerful thing for kids, and adults, to take away.” By immediately following the message of protection and heritage with suggestions on how to become involved, the aquarium is changing conservation attitudes and habits. “If we can turn a visit to the aquarium from ‘merely’ inspirational to one that actually calls to action and follows up,” Dohlin says, “that’s when we start to really redefine what a public aquarium is and how real conservation is accomplished.”
↑ Coral Tunnel.
↓ Edge with Sharks, Sea Turtle, Rays and Fish.
© Julie Larsen Maher/WCS (both photos)
When David Attenborough began his career in the 1950’s, the position of zoo curator demanded exceptional intrepidity. *Adventures of a Young Naturalist: The Zoo Quest Expeditions* (2018) recounts three of Attenborough’s earliest escapades as the London Zoo curator while filming for the BBC show *Zoo Quest*. The stories follow him and his small team on fantastic, often hare-brained adventures through the wildernesses of Guyana, Indonesia, and Paraguay as they chase after rare and implausible creatures.

As Attenborough himself points out, this was a very different time – a time when threats to the natural world were not yet clear. This reality seems so distant it is almost fictitious, but we are reminded that our world has undergone this transformation within the span of one man’s career. *The Zoo Quest Expeditions* is a captivating window into a past that will never again exist.

Written with his classic wit, Attenborough somehow charmingly conveys the absurdity in human nature that penetrates all societies, especially his own, but shares these observations without condescension. His reverence for local knowledge and culture is palpable, as he remains vigilant aware of his foreigner status in someone else’s home both during his time there and in his writing as he reflects on the experiences. Even when disturbed by local treatment of some species, Attenborough is respectful and recognises that their livelihoods are on the line, not his. Packed with sharply entertaining anecdotes Attenborough’s memoir is a delight to read. ■

Caitlin Ball, WAZA

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The live display of killer whales is an often controversial topic and has been hotly debated for the last 50 years. In his book, *Orca: How We Came to Know and Love the Ocean’s Greatest Predator* (2018), Jason Colby shines a light on the origins of a complex issue that is often oversimplified by critics and advocates alike. As the son of once-orca-capturer John Colby, he has rare access to many of the subject’s key players from the Pacific Northwest, the birthplace of live orca capture. A poignant, remarkably well-researched history of the relationship between humans and killer whales, *Orca* reveals how these animals went from hunted to beloved in the Pacific Northwest through live display. In doing so, the book showcases the dangers of painting species in a strongly polar light – negative views risk human violence against a species while overly positive views can breed careless enthusiasm.

This story draws on numerous sources to present opposing sides of the debate on live display. Capture of killer whales catalysed a momentous shift in attitude but caused extraordinary suffering along the way. Before the 1960s, humans viewed orcas as bloodthirsty pests whose eating habits were in direct competition with coastal economies. This hatred globally penetrated all levels of society. Even in the decade prior, the US Navy boasted numerous missions to help Icelandic fishermen slaughter killer whales, and fishermen the world over eagerly attacked the species at every opportunity. With the first capture and display of Namu, the third orca ever captured and the first healthy orca ever to be displayed in an aquarium exhibit, attitudes began to shift. Subsequent interactions with whales on live display drastically altered human perceptions by revealing the species’ profound intellect and endearing family relationships. Understanding breeds compassion led to the vicious, blind assaults coming to an end and the debate morphed from whale killing vs. whale catching to whale catching vs. whale watching. Colby presents the multifaceted discussion alongside his personal observations and reservations, but ultimately leaves it to the reader to take their own stance.

Caitlin Ball, WAZA
Update on International Studbooks (ISBs)

Changes between October 2018 and February 2019

**ISBs archived**
- Horned guan (*Oreophasis derbianus*)
- Red bird-of-paradise (*Paradisaea rubra*)
- Maroon-fronted parrot (*Rhynchopsitta terrisi*)

*Note:* These ISBs were vacant (without keepers) for more than a year. Former institutions keeping these ISBs were contacted, as well as regional zoo and aquarium associations, but no potential keepers were identified.

**New ISBs approved**
- Malayan sun bear (*Helarctos malayanus*)
  Establishment supported by Zoo and Aquarium Association (ZAA)
  Keeper: Kay Bradfield (Perth Zoo, Australia)
- Lear’s macaw (*Anodorhynchus leari*)
  Establishment supported by Brazilian Association of Zoos and Aquariums (AZAB) • Keeper: Angélica Sugieda (Sao Paulo Zoo Foundation, Brazil)

**Intra-institutional ISBs transfers**
- Andean bear (*Tremarctos ornatus*)
  from Amy Hall to Douglas Richardson (Durrell Wildlife Conservation Trust, UK)

**Inter-institutional ISBs transfers**
- Black howler monkey (*Alouatta caraya*)
  from Keri Baurr (Busch Gardens Tampa, USA) to Valéria do Socorro Pereira (Zoo-Botanical Foundation of Belo Horizonte, Brazil)
- Buff-crested bustard (*Lophotis gindiana*)
  from Sara Hallager (National Zoological Park Smithsonian Institution, USA) to Taylor Rubin (Atlanta Zoo, USA)

**Others**
- Black-winged Myna (*Acridotheres melanopterus*)
  Anais Tritto has moved from Cikananga Wildlife Centre (Indonesia) to Jurong Bird Park (Singapore), both institutions are co-keeping this ISB and A. Tritto remains as the keeper
Penguin Promises — A Behaviour Change Campaign

Dr Judy Mann
South African Association for Marine Biological Research (SAAMBR)

The Campaign — Penguin Promises
Visitors to uShaka Sea World, Durban, South Africa were encouraged to ‘Make a Promise to the Penguins’. A promise is a commitment by visitors to make one change in their daily lives to become more environmentally responsible. Visitors were asked to hand-write their behaviour change promise on a postcard and drop it into a specially designed post-box on site. Founded on human behaviour change theory, the campaign was positive, focused on love not loss, and empowered visitors to make the changes needed to help protect our environment. The tag line ‘We don’t want your money honey, we want your love’, proved very popular among visitors.

Why African penguins?
The African penguin was selected as the icon for the campaign as it is an endangered species in the wild, it is loved by visitors and uShaka Sea World is home to a thriving African penguin breeding colony.

Was the campaign successful?
Merely encouraging visitors to make a promise was not enough for the SAAMBR team, we wanted evidence of whether the campaign was effective, so working together with colleagues at the University of Queensland (UQ), Australia, visitors who had completed a postcard were contacted 12 to 18 months after their visit and asked about the outcomes of their promise. The results (N=316) showed that 49.4% of respondents could give an example of something positive they had done for the environment, that they attributed to the campaign.

While the numbers were impressive, respondents’ comments also helped us to understand the impact of the campaign.

Ultimately, this campaign has proved to be one of the most effective of its kind anywhere in the world, according to Professor Roy Ballantyne, a world renowned expert in the field of environmental/heritage interpretation and visitor research. What we learnt from this campaign about encouraging environmental behaviour amongst visitors to a zoo or an aquarium can be applied to many other facilities.

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Encouraging long-term environmental behaviour change

Penguin Promises Case Study


How can we encourage people to change their environmental behaviour at home?

Step 1: Visitors to the aquarium made an environmental promise.
4490 postcards were collected.
5974 promises were made.

Step 2: Follow-up survey.
4336 follow up emails 12 - 18 months later.
316 responses.

What made them keep their promise?

Why did they keep their promise?

- "I was shocked how careless some people are so I would like to make a difference"
- "The African Penguin being placed on the red list"
- "My love for animals and the ocean"
- "Having kids and wanting to make the earth a better place for them"
- "I was shocked I was doing that to the ocean"

What seems to be working?

- Building connections between promises and daily life is important.
- Giving visitors an opportunity to reflect as they select a promise personal to them.
- Writing a promise down formalises a commitment.
- Giving a cause a "face".
- Post visit follow up communication reinforces the commitment.

To share the results of the study more widely a paper on the research has been published in the international journal Environmental Education Research. We have produced a simple infographic which shares the headline results.

If you would like to know more about the Penguin Promises campaign or SAAMBR research, we would love to hear from you. Contact us at: jmann@saambr.org.za

www.saambr.org.za

Respondents said

Our SAAMBR and UQ teams were not content with just finding out if people kept their promises or not, we wanted to know why the campaign worked. So we asked respondents to cite the reasons they had kept their promise. Responses included:

- "I was at uShaka whilst on holiday – driving back I bought a little white figurine of a penguin. It now sits on my sink as a daily reminder of my penguin promise. I found a garden centre that recycles and I now collect all my items and take them twice a week."

- "Thanks for interacting with me, just reminded me that I actually have a part to play in respecting our world."

- "Made sure no plastics flew away from us in the wind, which was not the case before."

- "Having kids and wanting to make the earth a better place for them."

- "I have a responsibility to leave a legacy behind for the next generation""

- "My kids made the promise – and that’s what is important. Teaching the young to love nature and look after it."

- "The wish to preserve our wildlife for my children and to try and help right the wrongs that our generation have made"
The International Union for Conservation of Nature (IUCN) *Guidelines on the Use of Ex Situ Management for Species Conservation* outlines a decision process for exploring, evaluating, and selecting, if appropriate, ex situ activities to support conservation of a species. In an ideal world, such an evaluation would be done as part of a comprehensive species conservation plan that thoroughly integrates all conservation activities for a species with multi-stakeholder involvement – a method known as the One Plan Approach. This approach is likely to maximise conservation benefits but is also time consuming and costly. Taxon Advisory Groups (TAGs) and similar groups need to make decisions now on prioritising their human, institution and financial resources in the absence of detailed species plans to allow them to develop recommendations for population management and conservation based upon the needs of the species.

The ICAP process was developed as a result of this quandary. ICAP – or Integrated Collection Assessment and Planning – is a multi-species, rapid ex situ conservation assessment based on the decision process of the IUCN ex situ guidelines and involves both *in situ* and ex situ species experts. Jointly developed by the International Union for the Conservation of Nature Species Survival Commission (IUCN SSC), Conservation Planning Specialist Group (CPSG) and regional zoo associations – the European Association of Zoos and Aquaria (EAZA) and the Association of Zoos and Aquariums (AZA) – the ICAP process is designed largely to assist zoo associations to set conservation priorities for regional collection planning. An ideal audience is to have one or more TAGs to aid them in (inter) regional collection planning, although the process can be applied at other levels or to different organisations.

An ICAP begins with extensive data compilation on the status and threats for the wild population as well as historical and current ex situ population status and husbandry expertise. Existing conservation plans and activities are taken into account. A multi-stakeholder workshop with *in situ* and ex situ experts then rapidly identifies potential *ex situ* conservation roles; the programme requirements and relative value, risk and feasibility of each role; and evaluates which *ex situ* conservation roles and programmes, if any, are recommended for a species.

The first ICAP workshop, held in 2016 for a global assessment of all canid and hyaenid taxa, involved seven regional associations and two IUCN specialist groups as well as field experts. The two-day workshop produced general regional and global recommendations for 43 taxa. Clear guidance was developed on which
species could potentially benefit from ex situ management, how that management should be structured, and how recommendations might differ among regions. By evaluating all species, both threatened and species not currently under threat, as well as those currently inside and outside of collections, it is now possible to make conservation choices across the entire taxonomic group.

The ICAP process is being applied in a variety of settings and taxonomic groups, from confiscated turtle and tortoise species in Taiwan, to ornamental plants in Costa Rica. The simultaneous, cross-fertilising development of the ICAP process and EAZA’s new Regional Collection Planning (RCP) methodology means that EAZA RCPs and ICAPs now mirror each other. EAZA has produced six new-style RCPs and in April they hosted the global ICAP for callitrichids.

Benefits of the ICAP approach include increased collaboration among in situ experts, ex situ managers and IUCN specialist groups to set well-informed ex situ priorities, improved integration of all conservation activities for a species, and identification of ex situ conservation priorities across taxa, all within a relatively short timeframe.

The following direct and indirect potential conservation roles for the striped hyena were identified at the ICAP workshop:

<table>
<thead>
<tr>
<th>Direct Role(s)</th>
<th>Benefit</th>
<th>Feasibility</th>
<th>Risk</th>
<th>Rec?</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education (in range)</td>
<td>HIGH</td>
<td>HIGH</td>
<td>LOW</td>
<td>YES</td>
<td>To counter (perceived) livestock conflict issues. Help improve public perception of hyenas. Requires good attractive exhibits to improve image and targeted effort.</td>
</tr>
<tr>
<td>Research Taxonomic</td>
<td>MED</td>
<td>MED</td>
<td>MED</td>
<td>YES</td>
<td>The taxonomy both in situ and ex situ needs clarification. Zoos can contribute with samples, expertise, resources.</td>
</tr>
<tr>
<td>Insurance Potential in future; not needed now</td>
<td>LOW</td>
<td>MED</td>
<td>MED</td>
<td>NO</td>
<td>Currently low priority (appear to be doing ok in many locations). Lack of taxonomic clarity and certainty complicates this.</td>
</tr>
</tbody>
</table>

References

Efforts by conservation leaders are turning the tide for many species. Strategies to reintroduce populations, protect natural habitats, and mitigate threats have saved species such as the European bison, California condor, and South Africa’s wattled cranes.

These are battles we must continue to win. In the past century, the average rate of vertebrate extinction has been about 100-fold higher than the estimated background rate (1).

Understanding when species are at risk, and how best to bolster diversity and numbers, requires knowing at what age females reproduce, how many hatchlings or juveniles survive to adolescence, and how long adults live.

Yet comprehensive demographic data is missing for more than 98 percent of the 32,144 of extant described mammals, birds, reptiles, and amphibians. In a paper published earlier this month in Proceedings for the National Academy of Sciences, a team of 33 scientists show that demographic measures, not even crude ones such as maximum life span or typical litter/clutch size, were available for 65% of threatened mammals, birds, reptiles and amphibians.

It’s a gap with far-reaching implications for conservationists seeking to blunt the impact of the Earth’s sixth mass extinction event. Scientists working worldwide on behalf of the International Union for the Conservation (IUCN) Red List, IUCN Species Survival Commission, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), TRAFFIC, Monitor, and others, require demographic data to assess species populations and intervene where needed.

Conducting this research began with a multidisciplinary team that saw the need to equip conservation strategies with better evidence. It was the collaboration of researchers from nearly 20 global institutions that brought this project to fruition, including Interdisciplinary Center on Population Dynamics (CPop), Oxford, the Max Planck Institute for Demographic Research, the University of Southern Denmark, San Diego Zoo Global, and Species360 Conservation Science Alliance.

To understand what data are currently available, and to measure the void, researchers developed a Species Knowledge Index (SKI) that classifies available demographic information for 32144 known species of mammals, birds, reptiles and amphibians.

“The demographic knowledge of the species index provides significant information that, in conjunction with genetic data, allows estimations of events that affect population viability. Severe population declines, sometimes called genetic bottlenecks, influence the sustainability of populations, as we have found in studying endangered rhinos,” said Oliver Ryder, Ph.D., Director of Conservation Genetics, San Diego Zoo Global.

Turning first to go-to global sources of information, the index registers comprehensive birth and death rates for just 1.3 percent of these major classes of species. The map, which illustrates demographic knowledge for individual species, shows that many remain blank.

That changed when data was added from the Zoological Information Management System (ZIMS) curated by zoos, aquariums, refuge, research, and education centres in 97 countries. Across classes of species, key blanks filled with salient data.
↑ Eurasian eagle owl (Bubo bubo) flying low over fields and trees, England. © Richard Whitcombe

↑ Mantled guereza monkeys (Colobus guereza) are among many species of ‘howlers’ assessed as endangered, often due to deforestation. Species360 Conservation Science Alliance maps demographics, such as fertility rates and how many adolescents survive to adulthood, needed to assess whether populations can stave off these threats — and for how long. © Species 360
Incorporating ZIMS boosted the Species Knowledge Index eightfold for comprehensive life table information used to assess populations. Information on the age of first reproduction for females, a key piece to estimating how a population will fair in coming years, grew as much as 73 percent.

The study, ‘Data Gaps and Opportunities for Comparative and Conservation Biology’, suggests a value far beyond the data itself. As our team of Conservation Science Alliance and other researchers applied analytics to data aggregated across global sources, including ZIMS, we can impact outcomes for species in danger of extinction. Moreover, this can provide key insights for comparative and evolutionary biology, such as understanding the evolution of aging.

The team of 33 scientists including data analysts, biologists, and population dynamics specialists developed the first Species Knowledge Index to map just how much we know about species worldwide. The index aggregates, analyses and maps data from 22 databases and the IUCN Red List of Threatened species.

From here, Species360 Conservation Science Alliance researchers will continue to provide conservationists with evidence-based findings using the full scope of global data, including IUCN Red List, CITES, TRAFFIC, EDGE, A2E, ZIMS, and more. We thank our partners for their ongoing support and collaboration, including the World Association of Zoos and Aquariums (WAZA), Wildlife Reserves Singapore (WRS), and Copenhagen Zoo.

References


* The alpine ibex is an early example of success in reintroducing species nearly lost from their natural environment. Adult individual in the alpine mountain Boesenstein, Styria, Austria. © Helmut Lunghammer.

* Species360 Conservation Science Alliance researchers developed the Species Knowledge Index to map known demographics for major classes of species. Here, the addition of ZIMS increases data eightfold.
Species of the Year — Gibbons

Viktoria Michel
Project Coordinator Zootier des Jahres (Species of the Year)

Species of the Year is a campaign started by the Zoological Society for the Conservation of Species and Populations (ZGAP) and its partners: the German Association of Animal Parks (DTG), Association of German Zoo Supporters (GdZ) and the Association of Zoological Gardens (VdZ). The focus of this year’s campaign is on the graceful acrobats of the forest – gibbons.

The campaign is aimed at raising awareness about the threats and conservation needs of lesser known wildlife species kept in zoos, supporting their conservation in situ, as well as raising funds for conservation projects working directly with these species.

Many German-speaking zoos in Germany, Austria, Switzerland, Netherlands and Luxembourg take part in the campaign by installing posters, organising events, generating media coverage and informing their visitors about the importance of conservation work for the selected species.

Gibbons were chosen as the ‘Species of the Year 2019’ as they are under immense threat as a result of habitat loss, hunting for traditional medicine and the pet trade. Most species of gibbons are either listed as endangered or critically endangered on the IUCN Red List of Threatened Species.

Gibbons are apes but are often not perceived as such by the general public. Also called lesser apes, gibbons are placed in the shade of their relatives – great apes such as chimpanzees, bonobos, gorillas and orangutans – particularly when it concerns their protection. During the year-long ‘Species of the Year 2019’ campaign German-speaking zoos are engaged in lobbying activities to place this fascinating species in the limelight, and will simultaneously raise funds to support two gibbon in situ conservation projects.
At the end of 2018, WAZA welcomed new corporate member – Kenya Tropical Sealife LTD – to its nearly 400-strong membership base. The organisation is a marine ornamental export company located in Majengo, Kanamain, Kenya. Established in 2002, it has grown to be East Africa’s primary supplier of marine ornamental fish and invertebrates. As part of the company’s conservation programmes, Kenya Tropical Sealife in collaboration with Den Blå Planet, Denmark and the Kenya Wildlife Service, started a turtle rescue programme. The main aim of the programme is to rescue sick and injured turtles entangled in fishing nets, and or stranded along the beach. All turtles undergo rehabilitation at the centre and once a clean bill of health is given, they are tagged and released back to the ocean. The programme also organises community outreach to raise conservation awareness, beach clean ups and conducts research on sea turtles. Kenya Tropical Sealife is also a member of the Pan African Association of Zoos and Aquariums (PAAZA) and the European Union of Aquarium Curators (EUAC).

Welcome to the WAZA family!

The first project is ‘Anoulak’. The work of Project Anoulak focuses on biodiversity research and conservation, capacity building, anti-poaching patrols, habitat protection and especially environmental education for the next generation. The project is dedicated to the long-term conservation and study of wildlife in their natural habitats in Laos, particularly in the Nakai-Nam Theun National Protected Area with particular focus on the critically endangered northern white-cheeked gibbon (Nomascus leucogenys) and the endangered southern white-cheeked gibbon (N. sihi). Project Anoulak’s mission is to develop and implement innovative, multidisciplinary and sustainable approaches for the long-term conservation and study of the biodiversity and ecosystems in the protected area.

The second project is ‘Annamites’. A new protected area will secure a vital corridor of forest in the Annamite range, connecting several protected areas in Vietnam, Laos and Cambodia, helping to assure the survival of the endangered northern yellow-cheeked gibbon (Nomascus annamensis) as well as the critically endangered and endemic grey-shanked douc langur (Pygathrix cinerea). Maintenance of contiguous forest cover between these sites is important to facilitate interchange of genetic material between meta-populations of organisms, thereby preventing isolation and extinction. The Central Highlands and Annamite Mountain range are global biodiversity hotspots. The forest in Kon Plong is of global importance in species monitoring and habitat protection for primates, birds and flora. Besides nature conservation the project team also helps forest patrol staff to improve law enforcement via training.

Any support for the campaign is most welcome. Please contact us.

www.zootierdesjahres.de
zootierdesjahres@zgap.de
New WAZA Member

Aquatic tanks at Kenya Tropical Sealife. • The Kenya turtle rescue centre provides rescue and rehabilitative care to sick and injured sea turtles. © Kenya Tropical Sealife (both photos)
ZOOming Around the Community:

Zoo and Aquarium New Directors

- **Mr Jon Diderichsen** has been hired as the new CEO of the National Aquarium, Denmark.
- **Mr Kazumasa Kaburagi** has been appointed as the Director of Chiba Zoological Park, Japan.
- **Dr Francesco Petretti** has been elected as the President of Fondazione Bioparco di Roma, Italy.
- **Mr Rajendra Jakher**, IFS, has been appointed as the new Director of Padmaja Naidu Himalayan Zoological Park, India.
- **Mr Pierre Yves Bureau** has been appointed as the Executive Director of Parc Zoologique de Paris, France.
- **Ms Denise Verret** has been selected as the Interim Director of the Los Angeles Zoo, USA.
- **Mr Roel Welsing** has been appointed as the General Director of Apenheul Primate Park, the Netherlands.
- **Mr Aslak Sverdrup** has been chosen as the new CEO of Bergen Aquarium, Norway.
- **Mrs Astid Stewin** has been selected as the new CEO of Zoo Duisburg, Germany.
- **Dr Hendrik Berendson** has been appointed as the Director of ZOOM Adventureland, Germany.
- **Mr Michael Macek** has been promoted to Director of Saint Louis Zoo, USA.
- **Dr Jo-Elle Mogerman** has been hired as the Saint Louis Zoo North Campus Director.
- **Director Dennis Kelly** of Smithsonian’s National Zoo and Conservation Biology Institute has retired, and he is replaced by **Steven Monfort**.
- **Dr Hirofumi Watabe** has been appointed as the new Director of Tama Zoological Park, Japan.

**Georgia Aquarium**

Earlier this year, **Dwayne 'The Rock' Johnson** visited Georgia Aquarium, where he also took his family in August of 2018. In an Instagram post with Diego the sea lion, he said, “Important to see first hand the good work being done behind the scenes. My twin Diego here was rescued in San Diego from underneath a police car. Crazy story, but he’s a big (500lbs) happy boy these days.”

In a group of about 40 family members and friends, former President of the United States of America, **Jimmy Carter** and his wife **Rosalynn Carter** visited the Georgia Aquarium over the winter holidays in 2018. They attended a presentation, received a behind-the-scenes tour, and had a meet and greet with the famous rescued sea lion Diego.

**Santa Barbara Zoo**

Famous duo **Chrissy Teigen and John Legend** paid a visit to Santa Barbara Zoo in April, bringing along their two children and Teigen’s mother. The family posed for a photo with one of the zoo’s residents, a rather camera-shy giraffe.

→ © Dwayne ‘The Rock’ Johnson
→ © Georgia Aquarium

→ © Chrissy Teigen, Instagram
Add a new dimension to your visitor experience with the Aratag app – for museums, parks and tourist attractions of all kinds.

Aratag is a fully-integrated information system featuring a CMS and universal app that visitors download to their smart devices.

The app runs automatically when it detects a nearby facility using the Aratag system. With the power of Aratag’s underlying client CMS system, zoos, aquariums, museums and other tourist attractions can craft customized, site-specific app content for their visitors.

Aratag’s CMS software makes it easy for you to create and update customized app content, including menus, text, videos, AR, and active links.

Aratag gives you the power to intelligently monitor visitors, including demographics and visitor flows, visit durations, preferred attractions, and more.

You can also send push messages through the app, giving your visitors valuable information such as feeding times, closing time notices, transport information, fire alarms, evacuation routes, lost and found, etc.

Contact Pangea Rocks for an on-site demonstration of how Aratag gives you the power to deliver enhanced visitor experiences.
Number of reported natural disasters

- Droughts
- Earthquakes
- Floods
- Wildfires
- Major Hurricanes

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