

SPOTLIGHT ON ISLANDS

Calls to expand the Galapagos and Cocos Marine Reserves

The Galapagos Archipelago in Ecuador and Cocos Island, Costa Rica, are protected World Heritage Sites, known for their remarkable island and marine biodiversity. The islands are convergence points for cold and warm currents that support an array of migratory wildlife, including threatened sharks and sea turtles that travel nearly 120,000 km along the underwater mountain chain that connects the islands, forming the Galapagos Cocos Swimway. But despite existing marine reserves, industrial fishing remains a threat in this area. Conservationists, communities and local governments are now pursuing cooperative agreements to expand protections across the Swimway. Non-profit organizations are working with community organizers in the Galapagos to consolidate the scientific and legal reasoning to expand the Galapagos Marine Reserve. The Reserve's current level of protection is insufficient for many wide-ranging and migratory animals.

Source: *Island Conservation* (2021) islandconservation.org/conservation-community-calls-expanding-galapagos-marine-reserve

Research on Torres Strait Island butterflies could help conservation

A researcher from the University of Queensland, Australia, has spent decades compiling a first-of-its-kind database of the butterfly species of the Torres Strait Islands, boosting biosecurity and conservation measures in the region. Based on observations made during > 30 visits to the islands over the past 38 years, the list comprises 227 butterfly species. It will help local officials address the impacts of climate change, other anthropogenic threats and invasive weeds. As butterflies tend to move from place to place, they are good indicators to use in predicting invasions of pest species. The research has identified 17 butterfly species known to live in swampy habitats and mangrove areas on these islands that are affected by climate change. For example, the mangrove flash butterfly is one of two species endemic to the Torres Strait Islands; its mangrove habitat is threatened by rising sea levels.

Source: *The University of Queensland* (2021) stories.uq.edu.au/news/2021/the-butterfly-effect-how-torres-strait-butterflies-could-help-conservation-efforts/index.html

New Holland mouse feared extinct detected on Flinders Island

The New Holland mouse *Pseudomys novaehollandiae*, a small, nocturnal rodent that is vulnerable to extinction, has been observed on Flinders Island, Tasmania. Despite a considerable search effort, the confirmed sighting of the species was the first in 17 years, with the last evidence of any kind detected > 12 years ago. A number of images were obtained of an individual as it walked in front of a baited remote camera. More cameras and hair tubes were then installed to gauge the extent of habitat occupied by the species. The sighting and further survey work will help inform a national recovery plan for the species, which is threatened by severe fire events, changes in rainfall patterns, degradation of heathlands fragmentation of habitat, and predation by and competition with introduced species including feral cats and house mice.

Source: *Tasmanian Government* (2021) premier.tas.gov.au/site_resources_2015/additional_releases/new_holland_mouse_feared_extinct_detected_on_flinders_island

Cape Verde's sea turtle population booms as conservation pays off

Thanks in large part to conservation efforts on the Cape Verde archipelago, the number of loggerhead turtle *Caretta caretta* nesting sites has risen dramatically in the past 5 years. For centuries, the slow-moving reptiles were a local source of food, but economic growth has made other sources of protein more accessible and education initiatives have raised awareness of the need to protect them. In 2018, Cape Verde also criminalized the trade, consumption and killing of turtles. Some scientists think nesting numbers could also be linked to ocean productivity and the decline in shark populations worldwide, reducing the risk of predation. However, global heating may threaten the turtles' recovery: a turtle's sex is determined by the temperature of the sand in which the egg is incubated, and as this temperature increases, gender ratios are skewed. On the island of Maio, nearly 100% of hatchlings in 2019 and 2020 were estimated to be female. A diminished male population affects reproduction and decreases genetic diversity, which can hinder the species' ability to adapt to environmental changes.

Source: *The Guardian* (2021) theguardian.com/environment/2021/oct/26/fragile-success-cape-verde-sea-turtles-aoe

Wave of Hawaiian bird extinctions

In October 2021 the U.S. Fish & Wildlife Service declared 23 species across the USA extinct and proposed they lose protections under the Endangered Species Act. Eight of those species are Hawaiian forest birds: the Kaua'i 'Ō'ō, Kaua'i 'Akiāloa, Kaua'i Nukupu'u, Kāma'o or Large Kaua'i Thrush, Maui Ākepa, Maui Nukupu'u, Kākāwahie or Molokai Creeper, and Po'ouli. Half of the newly extinct Hawaiian birds were once found only on Kaua'i, and three were Maui endemics. One was resident to Moloka'i. They all became extinct for similar reasons: destruction of forest habitat, invasive predators and avian malaria, a mosquito-borne disease introduced to the islands within the last few centuries. Island species are particularly vulnerable to extinction. Amongst other factors, islands have limited areas of suitable habitat. On Hawaii, over nearly 200 years, American and European colonists have destroyed much of this habitat through large-scale agriculture and development.

Source: *Audubon* (2021) audubon.org/news/wave-hawaiian-bird-extinctions-stresses-islands-conservation-crisis

Bears killed on Vancouver Island

Conservation officers on Vancouver Island had to deal with a surge in negative human-bear interactions in 2021: during April–October, there were 337 calls about bear encounters in the Tofino-Ucluelet area, a 400% increase over 2020. Conservation officers had to kill a dozen bears that had become habituated to rubbish or other attractants such as chicken coops or bird feeders. Attracted by such food sources, bears have broken into homes, sheds, garages and back porches, posing a risk to public safety. A combination of several factors is thought to be the reason for the increase in human-bear encounters. The hot summer destroyed berry crops that the bears rely on ahead of the winter. Local salmon runs also performed poorly, and the area saw an influx of visitors as the province lifted COVID-19 travel restrictions, leading to an increase in rubbish. Conservation officers continue to monitor the situation, and local First Nations and municipalities have hired WildSafe coordinators to help educate the community and secure their properties.

Source: *Global News* (2021) globalnews.ca/news/8334158/vancouver-island-bears-killed

INTERNATIONAL

Fewer Weddell seals than previously thought

Researchers have estimated the global population of Weddell seals in Antarctica, concluding that there are significantly fewer seals than previously thought. Documenting the population trends over time will help scientists examine the effects of climate change and commercial fishing. The team, along with > 330,000 international volunteer citizen scientists, used hundreds of high-resolution satellite images covering huge areas of Antarctica to complete the count. It is the first direct population estimate ever conducted for the global distribution of any wide-ranging wild animal species. The count suggests there are c. 202,000 subadult and adult female Weddell seals, rather than the previously estimated 800,000, in Antarctica. In November, when the satellite images were taken, male seals are mostly in the water under the ice, so they were not captured. The researchers also gained new insights into the habitat of the seals: the animals prefer to be near the continental shore but also near deep water, possibly because of the location of predators and the fish they eat.

Sources: *Science Advances* (2021) [dx.doi.org/10.1126/sciadv.abh3674](https://doi.org/10.1126/sciadv.abh3674) & *Science Daily* (2021) [sciencedaily.com/releases/2021/10/211004153731.htm](https://www.sciencedaily.com/releases/2021/10/211004153731.htm)

Fish are increasingly exposed to endocrine disruptors

Exposure to microplastic pollution in aquatic environments is increasing the risk of endocrine disruption in fish, as microplastic particles can act as a vector of chemicals that interfere with their hormonal systems. A recent study examined the adsorption capacity of three kinds of polymer: polyethylene, polypropylene and polystyrene, to assess how well they attract and bind to micropollutants such as progesterone, and their desorption capacity—how quickly and easily they release these micropollutants into a fish's digestive tract. Although previous studies have investigated other micropollutants, this research focused on progesterone, a known endocrine disruptor, finding it behaves in much the same way in the presence of microplastics, but that it is released into digestive fluids to a greater extent. These findings strengthen the growing body of evidence that indicates the ingestion of microplastics could play a significant role in exposing aquatic organisms to endocrine-disrupting pollutants.

Source: *Phys.org* (2021) [phys.org/news/2021-10-fish-increasingly-exposed-endocrine-disrupters.html](https://www.phys.org/news/2021-10-fish-increasingly-exposed-endocrine-disrupters.html)

Over half of the world's vertebrates reside in the tropics

It has long been known that biodiversity is highest in the tropics. However, until now, scientists did not have a precise estimate of how many species resided there. Researchers have recently quantified the number of terrestrial vertebrates that live in the tropics, and found that tropical forests are home to 62% of the world's vertebrate species. Tropical forests play a fundamental role in biodiversity conservation and climate regulation, as they are carbon sinks and oxygen sources for the entire planet. Human activities have an increasingly negative impact on these environments, causing the forests to shrink and species to go extinct. Thus, it is important to determine how many animals live in these ecosystems. By examining the range maps of > 33,000 species and comparing them to data on the ecosystems of tropical forests across South America, Africa, Asia and Australasia, the team found that the tropics are home to 63% of all mammals, 72% of birds, 76% of amphibians and 42% of reptiles.

Sources: *Frontiers in Ecology and the Environment* (2021) doi.org/10.1002/fee.2420 & *Earth.com* (2021) earth.com/news/over-half-of-the-worlds-vertebrates-reside-in-the-tropics

Nature has saved us from worst climate impacts—for now

Nature itself has already saved humanity from a climate cataclysm, new research finds. Using a state-of-the-art computer model, a team of researchers simulated how ecosystems such as mangroves and old-growth forests absorb and store carbon. They then demonstrated how global temperatures would have risen if humanity had gone through the Industrial Age with a biosphere that did not actively absorb carbon pollution, concluding that under such conditions the world would be on track to hit 3 °C of warming by the end of the century, even if all other carbon emissions across our economies were drastically reduced. Currently, oceans, forests and other living ecosystems absorb and store c. half of our annual global carbon emissions, but these systems are under threat. According to the researchers, there are three key steps to avoid catastrophic climate change: halving emissions each decade to achieve carbon neutrality by 2050, transforming agriculture and forestry so they absorb more greenhouse gases than they emit, and restoring and expanding carbon-rich ecosystems such as old-growth forests.

Source: *Conservation International* (2021) [conservation.org/blog/study-nature-has-saved-us-from-worst-climate-impacts-for-now](https://www.conservation.org/blog/study-nature-has-saved-us-from-worst-climate-impacts-for-now)

New map pinpoints where people depend on nature the most

More than two-thirds of the population of the tropics, c. 2.7 billion people, directly depend on nature for at least one of their most basic needs, according to new research. The study is the first to quantify people's dependence on nature, and underscores the extent of the threat that climate change and the destruction of nature pose to human life. The researchers defined nature-dependent people as those who use natural resources to meet at least one of the four basic human needs: drinking water, housing materials, energy for cooking or livelihoods. After analysing interviews with > 5 million households in 85 tropical countries, they found that the greatest proportion of highly nature-dependent people is in the tropics of Africa (478 million people), followed by the Asia-Pacific region (278 million people) and tropical countries throughout the Americas (48 million people). Knowing where nature-dependent people live can help governments and decision-makers implement effective conservation and sustainable development strategies.

Sources: *Global Environmental Change* (2021) doi.org/10.1016/j.gloenvcha.2021.102368 & *Conservation International* (2021) [conservation.org/blog/new-map-pinpoints-where-people-depend-on-nature-the-most](https://www.conservation.org/blog/new-map-pinpoints-where-people-depend-on-nature-the-most)

Regions of greatest conservation potential identified

Researchers from > 40 institutions have ranked areas for global conservation priority by identifying locations whose protection would help minimize the number of threatened species and maximize carbon retention and water quality regulation. They found that for biodiversity, mountain ranges are of key importance, as are biomes in the Mediterranean and South-east Asia. The study revealed high-priority conservation areas such as the Cerrado grasslands in Brazil, the Cape Floristic Region in South Africa, and Western Australia. Among the top-ranked areas for carbon storage are eastern Canada, the Congo Basin, and Papua New Guinea. The eastern USA, the Congo, European Russia and eastern India ranked among the most important areas for water quality regulation. Improved management of the top 10% of the highest importance areas could achieve conservation targets for 43% of all species considered, and conserve 26% of total carbon and 22% of potential clean water.

Source: *Mongabay* (2021) [news.mongabay.com/2021/09/new-studies-identify-regions-under-greatest-threat-and-greatest-conservation-potential](https://www.mongabay.com/2021/09/new-studies-identify-regions-under-greatest-threat-and-greatest-conservation-potential)

EUROPE

German dogs to sniff out wildlife at building sites to speed up work

Sniffer dogs are being trained by German railway company Deutsche Bahn to find protected wildlife at planned major building sites to speed up projects. So far, people have been responsible for finding animals that need to be moved to a safer place while construction goes ahead, but the dogs are set to take over the job in 2022, following the completion of their training. The trainers are working with six dogs of different breeds, teaching them to sniff out protected animals such as creeping snakes, yellow-bellied toads, bats, wall lizards and sand lizards on railway tracks. The dogs learn to recognize the animals' smell by sniffing eggshells and sheddings. As the dogs explore the construction sites, their handlers will record their findings on a tablet using a new digital data platform aimed at giving all project participants and regulatory authorities access to real-time data about the detected species.

Source: CNN (2021) edition.cnn.com/2021/10/27/europe/sniffer-dogs-germany-rail-intl-scli-scn/index.html

Migrating birds spending longer in Europe

Migratory birds are spending longer in Europe, which raises questions over whether some will stop winter migration altogether, scientist say. A new study found a number of trans-Saharan flyers are spending up to 60 days per year more in European breeding grounds than before, probably because of climate change. The scientists studied 50 years of data from The Gambia and Gibraltar. Species affected include nightingales, willow warblers and several wagtails. The study used data collated by ornithologists in The Gambia during 1964–2019 and by The Gibraltar Ornithological and Natural History Society during 1991–2018, to explore changes in arrival and departure dates over time. Whereas previously it had been thought that birds timed migration based on day length, the study's findings suggest that birds are also making more nuanced decisions, responding to factors such as changes in climate and available vegetation. There could be increased competition for food in Europe during winter and autumn if the birds do not migrate. Meanwhile, the absence of the birds from Africa would have ecosystem implications, affecting insect consumption, seed dispersal and pollination.

Source: BBC (2021) bbc.co.uk/news/uk-england-tees-59030910

New European Red List of Birds released

Conservation NGO BirdLife International has released a new edition of the European Red List of Birds, a review of the regional conservation status of all 544 species of birds found in over 50 countries in Europe. It is the fourth assessment of this kind, following reports in 1994, 2004 and 2015. At the European regional level, 13% (71 species) of bird species are threatened, with c. 2% (8 species) Critically Endangered, nearly 3% (15 species) Endangered, and nearly 9% (48 species) Vulnerable. A further 6% (34 species) are considered Near Threatened, and five species categorized as Regionally Extinct. The report showed that waders, raptors, seabirds and wildfowl have the highest share of threatened and near threatened species per taxonomic group, along with smaller groups such as kingfishers, bustards and grebes. The main drivers of declining bird populations in Europe include large-scale land-use change, intensive agricultural practices, over-exploitation of marine resources, pollution of inland waters, unsustainable forest practices and infrastructure development.

Source: ZME Science (2021) zmescience.com/science/one-in-five-bird-species-in-europe-is-threatened-by-extinction/

Critically Endangered angel shark spotted in UK waters for first time

Incredible footage has been captured off the coast of Wales of one of the world's rarest sharks. Angel sharks have unusually flat bodies and fins, resembling rays. Experts have said that the shark seen in the footage is a juvenile, meaning that the species is breeding and raising their offspring in Welsh waters. Marine biologist and photographer Jake Davies, who captured the amazing footage of the angel shark in North Cardigan Bay, said it is the first time one has been caught on camera in UK waters. The species was once considered common in the Atlantic Ocean but has been categorized as Critically Endangered since 2010. Numbers have declined dramatically over the past 50 years, but the Angel Shark Project, a collaboration between Natural Resources Wales and the Zoological Society of London, is working with local communities and fishers to gather more data on the fish. This new footage is extremely useful to inform conservation efforts for this species, especially as Wales hosts one of the last angel shark populations in the northernmost part of their range.

Source: ITV News (2021) itv.com/news/2021-09-07/one-of-worlds-rarest-sharks-spotted-off-welsh-coast-for-first-time

Programme launched to remove dams and restore rivers across Europe

European rivers are the most fragmented in the world, which has led to the loss of many species and habitats. One of the biggest causes of fragmentation are man-made barriers that impede the natural flow of rivers. Dam removal is a relatively quick and cost-effective solution to restoring river continuity. This in turn can improve water quality, restore biodiversity and the abundance of wildlife in rivers and their surrounding habitats, and increase habitat connectivity and resilience. October 2021 saw the launch of the Open Rivers Programme, with a EUR 42.5 million investment over 6 years by Arcadia, a charitable fund of Lisbet Rausing and Peter Baldwin. The programme's focus will be to support organizations and communities working to restore rivers by funding dam removal projects that have the greatest possible impact on restoring river ecosystems. The programme is managed by Stichting European Open Rivers Programme, a charitable foundation registered in the Netherlands. Its vision is to create free-flowing rivers with healthy, diverse and connected ecosystems across Europe, which are enjoyed, valued and protected by the communities that depend on them.

Source: Dam Removal Europe (2021) damremoval.eu/open-rivers-launch

Bluefin tuna in Jersey tagged in conservation effort

Bluefin tuna in Jersey waters are being fitted with electronic tags in a bid to help protect the species. The project aims to help marine experts understand more about their movement and behaviour. The bluefin tuna was first spotted in Jersey in 2016, with sightings becoming increasingly common over the years. The species was recently recategorized from Endangered to Least Concern on the IUCN Red List. A total of seven fish have been fitted with the equipment, which will stay in place for at least 1 year. The study is the result of a collaboration between the Government of Jersey and researchers at the University of Exeter. Tags on five fish will collect data about where they had been on a daily basis for a year, after which they will detach automatically. A further two fish will be tracked using the tags for 2 years. The tagging project will provide data on how long the tuna stay in Jersey, where they go after they leave, and whether individual fish are coming back to the same area year after year. It is seen as a key opportunity to safeguard the species.

Source: BBC (2021) bbc.co.uk/news/world-europe-jersey-58543420

AFRICA

COVID-19 travel bans and conservation tourism in Africa

In Africa, half of all people working in tourism lost their jobs as a result of the COVID-19 pandemic and its effects on global travel. A recent UN Conference on Trade and Development report estimated a projected loss of USD 170–253 billion from the African tourism sector by the end of 2021. Tourism is an important source of funding for managing protected areas and provides jobs for people living near wildlife areas. When travel to protected areas such as national parks and community conservancies is cancelled en masse, jobs and conservation management are placed at risk. The majority of Africa's protected areas took a massive blow from the collapse in tourism. In South Africa, lockdowns caused a 96% drop in tourist visits to national parks under SANParks management. This meant a loss of c. 90% of tourism revenue, highlighting the vulnerability of a sector that relies on a single primary income stream. A recently assembled expert panel from the UN World Tourism Organisation expected levels of travel to Africa to get back to pre-pandemic levels by 2023 or 2024.

Source: *Phys.org* (2021) phys.org/news/2021-10-covid-tourism-africa.html

Climate change and deforestation pose challenges in Nigeria

The President of the African Development Bank Group and the Director General of the Nigeria Conservation Foundation have called for urgent measures to mitigate the impacts of climatic change on Lake Chad and the rate of deforestation in the country. Speaking at the Mid-Term Ministerial Performance Review Retreat, held in Abuja, Adesina, they stated that climate change and deforestation pose a great challenge to the resurgence of the nation's economic recovery from the COVID-19 pandemic. Climate change has already drastically altered the landscape of the Lake Chad basin. This vast area, which used to provide livelihoods and resources for fisheries, livestock and food production, is now littered with patch lands, dried up water beds and scorched earth. Nigeria is losing its forest at the rate of 350,000–400,000 ha per year, ranking the nation as one of the top five fastest deforestation countries in the world. This loss of forested area results in desertification, soil erosion and flooding.

Source: *ThisDay* (2021) thisdaylive.com/index.php/2021/10/18/climate-change-deforestation-pose-challenge-to-nigerias-economic-resurgence

Melting of iconic African glaciers

The *State of the Climate in Africa 2020* report, released in 2021, provides a snapshot of climate change trends and impacts, including the melting of Africa's iconic glaciers. Presently, only three mountains in Africa are covered by glaciers: the Mount Kenya massif in Kenya, the Rwenzori Mountains in Uganda and Mount Kilimanjaro in Tanzania. Although these glaciers are too small to act as significant water reservoirs, they are of eminent touristic and scientific importance. Like glaciers in other mountain ranges, the African glaciers reached a late Holocene maximum extent around 1880. Since then, they have been shrinking and are now at < 20% of their extent in the early 20th century. Their current retreat rates are higher than the global average. If this continues, it will lead to total deglaciation by the 2040s. Mount Kenya is expected to be deglaciated a decade sooner, which will make it one of the first entire mountain ranges to completely lose its glaciers as a result of human-induced climate change.

Source: *World Meteorological Organization* (2021) public.wmo.int/en/media/press-release/climate-change-triggers-mounting-food-insecurity-poverty-and-displacement-africa

Landmark publication on state of Madagascar's birds

Having been isolated from other land masses for 88 million years, Madagascar is home to many endemic taxa, including 115 unique bird species. To pinpoint where and how to take conservation action to protect this extraordinary diversity, in 2021 ASITY Madagascar (a BirdLife International partner) released the first comprehensive report on the state of the country's bird populations, published in English, French and Malagasy. Birds react quickly to environmental change, and are one of the most popular, visible and well-researched groups of animals. As such, they are excellent indicator species for the condition of nature as a whole. Forty-two bird species in Madagascar are now categorized as globally threatened on the IUCN Red List, including 29 that are endemic to the island. Many of the threatened species rely on forest habitats, which are under significant threat from deforestation. The new report summarizes the current conservation status, the key threats and the actions already underway to conserve the country's bird species, and aims to make science-based evidence available to decision-makers.

Source: *BirdLife International* (2021) birdlife.org/news/2021/10/19/state-of-madagascars-birds-revealed-in-landmark-publication

Tuskless elephants are more common in the aftermath of civil war

A new study suggests the higher proportion of tuskless African elephants *Loxodonta africana* in Mozambique's Gorongosa National Park is probably a result of rapid selection driven by poaching during the country's civil war. Armed forces financed the intense 15-year conflict through the sale of ivory tusks, in pursuit of which 90% of the Park's elephants were wiped out. As tuskless individuals were not targeted, they were more likely to survive and pass on the genetic adaptation that resulted in their lack of tusks. Prior to the war, analysis of footage filmed in the National Park showed that c. 18% of females were born without tusks, whereas the number increased to 33% in the generation born after the war. Genetic analysis indicated that genes active in mammalian tooth development had unique mutations in female tuskless elephants. However, the same genetic mutation carried by these individuals results in the death of male elephants before they are born. Although the Gorongosa elephant population is now recovering, the effect of aggressive poaching during the conflict will probably last many generations.

Source: *Science* (2021) science.org/content/article/civil-war-drove-these-elephants-lose-their-tusks-through-evolution

Libyan Biosphere Reserve threatened by climate change and human activity

The Ashaafean Park covers > 83,000 ha near Libya's Nafusa mountain range, on the edge of the Sahara Desert. Its dry woodland, grassland and desert habitats have long been a refuge for hyaenas, 350 plant species, threatened reptiles and rare birds such as the houbara bustard *Chlamydotis undulata*. In 2021, UNESCO categorized the Park as a Biosphere Reserve, the first in Libya to date. It is hoped that this new designation will help to protect the Park, which has become increasingly vulnerable to fire as a result of climate change, leading to lack of rain and prolonged drought. These wildfires, together with increased human activity such as logging and construction, have damaged local biodiversity. Approximately 65,000 people live within the wider Park area, and in the decade of violence following the 2011 overthrow of the al-Qadhafi dictatorship, the fragile Libyan state has not been able to effectively protect nature reserves. Several initiatives are now underway to protect the reserves, including a programme to breed endangered tortoises in captivity and release them into the wild.

Source: *Phys.org* (2021) phys.org/news/2021-10-climate-human-threaten-libya-nature.html

AMERICAS

Illegal mining in the Amazon hits record high amid Indigenous protests

Indigenous territories, long a bulwark against deforestation in the Amazon, are under increasing threat in Brazil, according to an analysis of 36 years' worth of satellite imagery. The data show that illicit mining operations on Indigenous lands and in other areas formally protected by law have hit a record high in the past few years, under the administration of President Jair Bolsonaro, underscoring fears that his policies and rhetoric are undermining both human rights and environmental protection across the world's largest rainforest. These operations strip the land of vegetation and pollute waterways with mercury. Researchers at MapBiomas, a consortium of academic, business and non-governmental organizations that has been conducting geospatial studies across Brazil, developed algorithms that they used in conjunction with Google Earth Engine to conduct the analysis. Indigenous groups have frequently found themselves in violent clashes with miners since Bolsonaro took office in 2019, and are demanding more protection for their land. Although Indigenous territories are legally protected, Bolsonaro has openly called for mining and other development in them.

Source: *Nature* (2021) [nature.com/articles/d41586-021-02644-x](https://www.nature.com/articles/d41586-021-02644-x)

Record number of applications for elk hunting in Michigan

The year 2021 saw a record high in applications for the 300 available permits to hunt elk *Cervus canadensis canadensis* in Michigan, USA. There were > 5,000 applications more than the previous year, consistent with a decade-long trend of rising interest in hunting the state's elk herd, which is estimated to be c. 1,200 individuals. The limited number of tags are issued in a lottery. Michigan's elk descend from a small population introduced in 1917, following the extinction of the state's native elk in the late 1800s. Each application costs USD 5, generating c. USD 250,000 for the Michigan Department for Natural Resources in 2021. The money helps to fund the elk habitat rehabilitation programme, and the number of available permits is carefully calculated to result in a healthy elk population that does not exceed the region's biological carrying capacity.

Source: *The Detroit News* (2021) [eu.detroitnews.com/story/business/2021/10/24/record-elk-hunting-applications-fuel-conservation-efforts/6141745001](https://www.detroitnews.com/story/business/2021/10/24/record-elk-hunting-applications-fuel-conservation-efforts/6141745001)

Huge numbers of fish-eating jaguars prowl Brazil's wetlands

Most jaguars are solitary and hunt terrestrial mammals, but new research in the Pantanal wetlands in central Brazil reveals a previously unseen degree of flexibility in the diet and lifestyle of these felids. A research team deployed 59 camera traps in the area during 2014–2018, and collected > 1,500 videos of jaguars. The researchers also captured 13 jaguars and used GPS or radio-tracking collars to gain insight into population density, movements and social interactions. Jaguars were the most common mammal captured by the cameras and were seen wading through chest-deep waters searching for fish and aquatic reptiles. When not hunting, they playfully grappled with each other on land. The discovery provides key information on the felids' role in food webs, helping scientists examine the effect of environmental changes on the species. Based on their data, the team estimated that the area hosts the highest density of jaguars ever recorded: a mean of 12.4 individuals per 100 km², nearly triple the next highest estimates from other areas.

Sources: *Ecology* (2021) doi.org/10.1002/ecy.3543 & *Science News* (2021) [science news.org/article/jaguars-brazil-wetland-huge-numbers-fish-hunt-play](https://www.sciencenews.org/article/jaguars-brazil-wetland-huge-numbers-fish-hunt-play)

Fires devastate wildlife in Bolivia's protected areas

Forest fires in Bolivia have torn through several protected areas, with devastating effects for wildlife unable to escape the flames or find water in the scorched landscape. With almost 1 million ha burned by October 2021, experts were warning of a repeat of the devastation of recent years. In 2019, fires affected nearly 6 million ha, and 4 million ha burned in 2020. The department of Santa Cruz in eastern Bolivia was the worst-hit region in 2021, and fires in the region spread into protected areas, including the San Matías Integrated Management Natural Area, Ñembi Guasu Area of Conservation and Ecological Importance, and the recently created Bajo Paraguá San Ignacio de Velasco Municipal Protected Area. Fuelled by prolonged drought, the fires spread rapidly, and conservationists reported many dead mammals and reptiles in the wake of the flames. Bolivia's forest fires have also crossed the country's border and advanced into Paraguay. The practice of slash-and-burn, to clear the land for planting crops, has become the main cause of forest fires in Bolivia.

Source: *Mongabay* (2021) [news.mongabay.com/2021/10/fires-leave-trail-of-dead-wildlife-scorched-land-in-bolivias-protected-areas](https://www.mongabay.com/2021/10/fires-leave-trail-of-dead-wildlife-scorched-land-in-bolivias-protected-areas)

Research needed to restore Canada's sunflower sea stars

Ocean Wise, a conservation organization based in Vancouver, Canada, is pushing for continued study and more resources to help restore a species of sea star following a mass die-off and cascading consequences for other marine life. A study released in October 2021 stated that the decimation of sunflower sea stars has resulted in barren underwater landscapes in places such as Howe Sound, as the disappearance of the marine animals has thrown ecosystems out of balance. In 2013, sea stars such as the sunflower sea star, which can grow up to 1 m in diameter and have 24 arms, began displaying lesions, which eventually caused the animals to dissolve and die. In some areas 99–100% of the creatures were wiped out. With sunflower sea stars gone, their main diet, green sea urchins, surged and ate through entire forests of sea kelp, eventually wiping out the plant in some areas and creating what is described as urchin barrens. Successful restoration efforts for sea stars will depend on a better understanding of what caused the wasting disease.

Source: *CBC* (2021) [cbc.ca/news/canada/british-columbia/b-c-ocean-researchers-push-to-help-understand-restore-all-but-extinct-sunflower-sea-stars-1.6213414](https://www.cbc.ca/news/canada/british-columbia/b-c-ocean-researchers-push-to-help-understand-restore-all-but-extinct-sunflower-sea-stars-1.6213414)

Invasive mussel is devastating ecosystems in South American rivers

Golden mussels *Limnoperna fortunei*, native to the Yangtze River in China, arrived in the Americas in the 1990s in the ballast water of ships. They attach to surfaces by releasing super-adhesive filaments known as byssal threads, which allow them to take over areas unexplored by native molluscs that lack this sticking power. With a speedy reproductive cycle and in the absence of predators to control them, they have spread at c. 240 km per year. The mussels filter plankton, monopolizing nutrients that would otherwise feed other river-dwelling species or flow into the ocean, thereby unbalancing the entire ecosystem. A 2008 assessment of Brazil's Alto Paraná River found the mussels had devastated colonies of freshwater sponges that act as nurseries for larvae of aquatic insects. Similar damage now threatens the Amazon. More than 2,500 fish species unique to the basin depend on the nutrient-rich Amazon water and its plants and algae. Scientists warn that depleting the Amazon's nutrients that support sea life in the Atlantic Ocean will affect this balance on a massive scale.

Source: *Science* (2021) [science.org/content/article/golden-mussels-devastating-south-american-rivers-amazon-may-be-next](https://www.sciencemag.org/content/article/golden-mussels-devastating-south-american-rivers-amazon-may-be-next)

ASIA & OCEANIA

Asian deer's comeback marks rare conservation success in China

An Asian deer's comeback from the brink of extinction marks a rare success for China's conservation efforts, which have long faced criticism for focusing on only a handful of flagship species. Père David's deer *Elaphurus davidianus* was on the verge of disappearing towards the end of the 19th century, threatened by hunting for its meat and a loss of wetland habitat. However, after some extraordinary efforts, which involved individuals smuggled to Europe and hidden from wartime bombing raids before finally returning to China, its population has grown to several thousand. But experts say such success stories remain rare, with decades of breakneck growth exacting a heavy toll on China's biodiversity. Although the country has made significant strides in protecting its best-known species such as the giant panda and Asian elephant, critics say it has done far worse in safeguarding many other creatures. During 1970–2010, almost half of China's land-based vertebrates vanished, according to the conservation charity WWF.

Source: *France 24* (2021) [france24.com/en/live-news/20211015-asian-deer-s-come-back-marks-rare-china-conservation-success](https://www.france24.com/en/live-news/20211015-asian-deer-s-come-back-marks-rare-china-conservation-success)

Seizure of hornbills in Malaysia reveals increase in live trafficking

The confiscation of eight live hornbills at Kuala Lumpur International Airport in August 2021 confirmed experts' suspicions that live hornbill trafficking is an increasing trend in South-east Asia. Analysis of seizure records from across the region indicates that this recent incident is just the tip of the iceberg; during 2015–2021, 99 cases of live hornbill trafficking were intercepted, involving 268 birds spanning 13 species. All eight birds seized in Kuala Lumpur were species native to Malaysia, though whether they were taken from the wild or bred in captivity is unclear. Among them was a baby helmeted hornbill *Rhinoplax vigil*, a Critically Endangered species hunted to the brink of extinction for its ivory-like bill casque, which is prized by collectors in parts of Asia. Specialists say more information on how poaching for live trade affects wild populations is urgently required to enable a push for stronger enforcement and the closing of loopholes that allow the illegal trade to flourish.

Source: *Mongabay* (2021) [news.mongabay.com/2021/09/malaysian-hornbill-bust-reveals-live-trafficking-trend-in-southeast-asia](https://www.mongabay.com/2021/09/malaysian-hornbill-bust-reveals-live-trafficking-trend-in-southeast-asia)

Landmark studies on snow leopards

Snow leopards are elusive and notoriously difficult to study. The harshness and vastness of their high-altitude range, which encompasses 12 countries in Central Asia and comprises some of the highest mountain ranges in the world, is forbidding for both humans and technology. But after > 40 years of continuous research and innovation, studying snow leopards has become easier. Thanks to extensive camera trapping, two large-scale studies in 2021 unveiled robust scientific data on the snow leopard population for the first time. A 3-year survey completed in the northern Indian state of Himachal Pradesh estimated the presence of up to 73 wild snow leopards there. A second milestone study provided a preliminary assessment of snow leopard populations for the whole of Mongolia, with early results indicating the presence of nearly 1,000 individuals—the world's second-largest population after China. Both studies were part of the Population Assessment of the World's Snow Leopards (PAWS) programme. PAWS aims to produce a robust estimate of the species' global population within the next 5 years.

Source: *Al Jazeera* (2021) [aljazeera.com/news/2021/10/14/research-snow-leopard-ladakh-india-tibet-himalayas](https://www.aljazeera.com/news/2021/10/14/research-snow-leopard-ladakh-india-tibet-himalayas)

Reintroduction saves world's smallest wild hog from extinction

The elusive and diminutive pygmy hog *Porcula salvania* once thrived across the sub-Himalayan plains from Nepal to Uttar Pradesh, India. Today, there are thought to be < 300 individuals remaining in the wild, their range limited to India's Assam state. Sensitive to changes in environment, the Endangered pygmy hog suffered as a result of increasing pressure on its habitat from human encroachment, overgrazing, and the clearing and burning of grassland for agriculture. It was believed extinct before it was rediscovered by a tea estate manager in 1971. Early attempts at captive breeding failed until 1995, when the Pygmy Hog Conservation Programme was established by the Durrell Wildlife Conservation Trust, the IUCN Wild Pig Specialist Group, Assam's Forest Department and India's Environment Ministry. Animals are bred and kept in a pre-release facility for 5 months, before being released into Orang, Sonai-Rupai, and Bornadi Wildlife Sanctuaries. Pygmy hogs need thick cover and build grass nests throughout the year, so the programme works with local communities to improve management of their grassland habitat.

Source: *The Guardian* (2021) [theguardian.com/environment/2021/mar/03/how-the-pygmy-hog-was-saved-from-extinction-aoe](https://www.theguardian.com/environment/2021/mar/03/how-the-pygmy-hog-was-saved-from-extinction-aoe)

Addressing the problem of Bali's rubbish rivers

In Bali, plastic pollution of waterways is a serious problem. For example, a 2021 New Year's clean-up removed > 30 t of marine litter from Kuta Beach and neighbouring beaches. Although the tourism ministry funds regular beach cleaning, plastic trash still pollutes rivers and the ocean. To address the problem, organization Sungai Watch has installed barriers, made out of steel cables, metal grids and tubular PVC floats, on Bali's rivers to trap waste before it reaches the ocean. The organization now has 40 employees, and five dedicated teams make daily rounds of the barriers to remove the waste. During November 2019–July 2021, the 100 barriers intercepted 650 t of waste. The barriers allow fish to pass through and can withstand rainy season floods.

Source: *Hakai Magazine* (2021) hakaimagazine.com/article-short/solving-balis-rivers-of-trash

Sympatric carnivores may adjust schedule to avoid each other

Carnivorous mammals may adapt their daily schedules to avoid other species, as a way of negotiating space and resources for survival. Researchers monitored this temporal niche partitioning intermittently over 6 years with 73 camera traps installed at three sites in the Malaysian state of Sabah on Borneo. They collected 37,379 photographs over 3 years. In the dataset, the researchers identified nine carnivore species with sample sizes > 10 and categorized their activity patterns by time of day. Six species were active at night, two during the day and one at various times. Some of the more closely related animals demonstrated a clear temporal segregation, including two wild felids, one of whom was nocturnal whereas the other preferred the day. The researchers also found that tourism may have an impact on mammal behaviours.

Sources: *Scientific Reports* (2021) [dx.doi.org/10.1038/s41598-021-99341-6](https://doi.org/10.1038/s41598-021-99341-6) & *Phys.org* (2021) phys.org/news/2021-10-carnivores-adjust.html

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