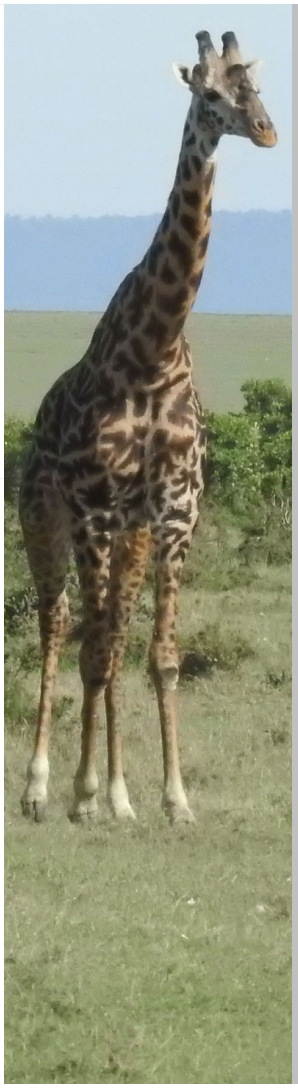

EDITORIAL ESSAY: COVID-19 AND PROTECTED AND CONSERVED AREAS

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ABSTRACT

The COVID-19 pandemic is having a dramatic impact on the global community; on people's lives and health, livelihoods, economies, and behaviours. Most zoonotic disease pandemics, including COVID-19, arise from the unsustainable exploitation of nature. This special editorial provides a snapshot of how protected and conserved areas around the world are being impacted by COVID-19. For many protected and conserved areas, negative impacts on management capacity, budgets and effectiveness are significant, as are impacts on the livelihoods of communities living in and around these areas. We provide a commentary on how effectively and equitably managed systems of protected and conserved areas can be part of a response to the pandemic that both lessens the chance of a recurrence of similar events and builds a more sustainable future for people and nature. We conclude the editorial with a Call for Action for the rescue, recovery, rebuilding and expansion of the global network of protected and conserved areas.

Key words: COVID-19, coronavirus, pandemic, protected areas, conserved areas, one health approach, call to action

INTRODUCTION

The COVID-19 pandemic, caused by the SARS-CoV-2 virus (Zhou et al., 2020), is changing almost everything. It is first and foremost a deep human tragedy, which has already killed hundreds of thousands of people and altered the lives of billions. It is having dramatic impacts on the global economy (Maliszewska et al., 2020; McKibbin & Fernando, 2020). It has thrown many assumptions about our future into doubt and has created a collective moment for contemplation about the future. We are only just beginning to understand its implications for humanity and our relationship with nature. The origins of most zoonotic disease pandemics and epidemics, such as COVID-19, lie in a breakdown in

that relationship, arising from an unsustainable exploitation of the natural world (Patz et al., 2004). The implications of this unprecedented event, and of the human responses to it, are therefore profound. They raise fundamental questions about the ways in which humanity impacts nature, for example through the destruction of ecosystems, the unsustainable consumption of wildlife and the illegal wildlife trade.

At this critical time, we assert that effectively and equitably managed networks of well-connected protected and conserved areas[1], by maintaining the ecological integrity of natural ecosystems, provide one of the most important ways in which to strengthen and repair the relationship between people and the natural systems on which they depend. Of course, protected and conserved areas cannot address all the issues around COVID-19 and the natural world. However, they are both highly impacted and do offer important solutions.

This special editorial first provides a global commentary on how protected and conserved areas, both on land and in the oceans, are being impacted by COVID-19. We then present some scenarios outlining what possible futures they might face. We conclude with a Call for Action. We plan to use this Call for Action to open a wider discussion and to build on and refine this proposal. We hope many countries and sectors will be ready to work together to develop these ideas and support the necessary action. This will ensure that protected and conserved areas play an important role in a resilient planetary recovery from COVID-19, advancing human and economic health and well-being.

SETTING THE SCENE

It is now well recognised that the exploitation of wild species and wild places, deforestation, uncontrolled expansion of agriculture, intensification of farming, and infrastructure development have increased and modified the interface between people and wildlife, and thus created a 'perfect storm' for the spillover of diseases from wildlife to people (Plowright et al., 2017; Faust et al., 2018). These zoonotic diseases – diseases that originate in animals and are transmitted to humans – can more easily become epidemics or pandemics due to our hyper-connected global societies and transportation systems. Maintaining the ecological integrity of nature through protected and conserved areas is critical to halting biodiversity loss and can contribute to reducing the risk of zoonotic spillover.

Protected and conserved areas safeguard nature while at the same time providing food and water security, disaster risk reduction, climate mitigation and adaptation, and innumerable cultural, spiritual and health values (Dudley et al., 2010). Despite growing recognition of these benefits, they are often undervalued and not sufficiently supported by the policy and resources needed for effective conservation. How protected and conserved areas are treated during and after the COVID-19 pandemic will have major implications for nature and for humanity's reliance on nature; they should be a central part of the move towards greener economies.

The current pandemic and its aftermath could undermine decades of conservation effort. But this crisis could also offer an opportunity to transform the economic approach that has led to this situation, and to forge green, inclusive policies for a sustainable recovery. It could be used to build a far more positive future for these places and thus improve the prospects for human well-being everywhere.

The idea that we need a "One Health" approach runs through this text. One Health recognises that the health of humans, animals and ecosystems are interconnected (Aguirre et al., 2002; Cook et al., 2004). It applies a coordinated, collaborative, multidisciplinary, trans-boundary and cross-sectoral approach to address risks that originate at the animal–human–ecosystem interface. The adoption of a One Health approach is increasingly urgent as the accelerating human footprint on the natural world increases the risks of further zoonotic disease spillover. As nations develop plans to reinvigorate their economies post-COVID-19, we encourage the incorporation of a One Health approach, thereby ensuring an economic recovery that avoids further environmental degradation, reduces the risk of further zoonotic outbreaks and helps build a more resilient future. Effectively and equitably managed networks of protected and conserved areas, both terrestrial and marine, should be a crucial part of this approach.

COVID-19 AND PROTECTED AND CONSERVED AREAS – WHAT WE KNOW SO FAR

Relationship between protected and conserved areas and zoonoses

Wildlife serves as the origin for over 70 per cent of all zoonotic emerging diseases (Jones et al., 2008), with the rest coming from livestock. Wildlife, like humans and their domestic animals, carry thousands of naturally occurring viruses and microbes. Most are harmless, but a few have the potential to cause disease in their host populations, and some can cross the species barrier. As human numbers have grown and the resulting human footprint on the planet has expanded (O'Bryan et al.,

2020), the opportunities for more contact between wildlife and humans have increased. Almost half of zoonotic emergence events are driven by land use change and associated activities (Keesing et al., 2010). More frequent contacts make it more likely that potential pathogens will jump from wildlife to humans (and, in some circumstances, from humans to wildlife). Some of these spillover events have led to the spread of pathogens in epidemic and pandemic proportions, such as HIV-AIDS (which has killed over 30 million people[2]), Ebola virus disease, SARS, MERS and avian flu; such too is the case of COVID-19 (Anderson et al., 2020).

The large-scale conversion and transformation of natural ecosystems, including land use change caused by food production, facilitate the 'spillover' of pathogens from wildlife to human populations (Allen et al., 2017; Patz et al., 2004; Karesh et al., 2012). The ecological condition of an area may either buffer or facilitate pathogen shedding within reservoir host species, and between them. Human actions within and around natural forests and other ecosystems that disturb wildlife species and their ecology may lead to greater pathogen shedding and facilitate contact spreading (Johnson et al., 2020).

Well-designed and managed networks of protected and conserved areas help to maintain intact natural habitats and ecological integrity (Geldmann et al., 2013). Where protected areas are being established, or exist, alongside intensively used land, it is important to minimise edges, separate intensive land uses and wildlife, and manage for healthy functioning ecosystems. An awareness of disease dynamics should become a feature in the design and management of protected and conserved areas in the future.

Impacts of COVID-19 on protected and conserved areas

We are only just beginning to understand the impact of the COVID-19 pandemic on protected and conserved areas, but there are already many indications of the direct impacts at site level, the future challenges and the emerging policy implications.

Economic impacts from loss of tourism

Wildlife and nature tourism are major contributors to economic activity around the world. Before the pandemic, researchers estimated that the world's protected areas received roughly eight billion visits per year, generating approximately USD 600 billion per year in direct in-country expenditure and USD 250 billion per year in consumer surplus (Balmford et al., 2015). A 2019 estimate puts the direct value of wildlife tourism at USD 120 billion or USD 346 billion when multiplier effects are accounted for, and it generated 21.8 million jobs (World Travel and Tourism Council, 2019). This income has virtually stopped as a result of COVID-19: a recent survey of African safari tour operators found that over 90 per cent of them had experienced declines of greater than 75 per cent in bookings and many indicated they had no bookings at all, thus affecting local employment[3]. With more than 16 million people directly or indirectly employed in tourism within the African region, the impact is immense. Community-based conservation areas in particular provide income support for families through a share in tourism-derived income. The Mara Naboisho Conservancy in Kenya, for example, provided the main cash income for over 600 Maasai families; this has now disappeared with the cessation of tourism[4].

Local community guides earned income by taking tourists on walks through the Mara Naboisho Conservancy — income that has now ceased as a result of the pandemic © Marc Hockings

In addition, many communities living near protected areas benefit from a share of tourism revenues; for example, those living around the mountain gorilla parks in Rwanda, Uganda and Democratic Republic of the Congo benefit from a proportion of park fees (Maekawa et al., 2015). This important source of revenue for communities will be hard hit (Spenceley, in prep.). In some cases, the economy of entire towns – such as Hoedspruit adjacent to Kruger National Park in South Africa – has come to a standstill after the shutdown of the adjacent protected area[5]. Communities depending on tourism adjacent to Costa Rican protected areas and Galapagos National Park, Ecuador are similarly affected[6]. This loss of income from tourism is unlikely to be short-lived: a study by Global Rescue and the World Travel and Tourism Council (2019) found that the average time from impact to economic recovery of tourism following disease outbreaks was 19.4 months.

The dangers of relying on international tourism to sustain conservation have been recognised for a long time, and there are some moves to support communities to become more resilient and less dependent on this source of revenue[7]. However, for protected and conserved areas that do rely heavily on this kind of income, the pandemic has exposed their vulnerability and demonstrated that local economies are equally exposed (Spenceley, in prep).

Direct, site-level impacts on protected and conserved areas

Protected and conserved areas have been impacted negatively in many ways. Management effectiveness may be reduced through budget and staff cuts. The Indigenous peoples and local communities that depend on these areas may find their economies badly disrupted and their livelihoods threatened. Pressures on biodiversity and ecosystems may then grow as people turn to alternative sources of subsistence and income. This in turn undermines the functioning of ecosystem processes and services within and around sites, causing a further negative cycle of impacts on people.

Direct ecological impacts – The potential for zoonotic diseases to have devastating impacts on wildlife populations has been well documented. Chimpanzees and gorillas are highly susceptible to respiratory viruses (Gibbons, 2020). In one study area in the Congo, about 5,000 gorillas are estimated to have died from Ebola virus in 2002–2003 (Bermejo et al., 2006). In the Atlantic Forests in Brazil, many thousands of non-human primates – as well as hundreds of people – died as a result of an outbreak of yellow fever (Dietz et al., 2019). Early indications are that dozens of species of non-human primates are likely to be susceptible to the virus causing COVID-19 (Melin et al., 2020). This is a particularly high risk for non-human primates like mountain gorillas that are habituated, and thus in regular contact with humans. A disease outbreak could be devastating for this still fragile subspecies and the ecosystem in which it plays a crucial role. It would also destroy the mountain gorilla tourism sector that currently funds the management of all mountain gorilla protected areas, as well as many other protected areas in their range countries, and provides crucial revenue sharing income for surrounding communities. Stringent contingency plans, including the complete closure of tourism, are being developed to avoid transmission of the virus[8]. On the positive side, there are reports of benefits for sensitive wildlife species in protected areas because of reduced human activity (Corlett et al., 2020), but such benefits are likely to be ephemeral once restrictions of human movement are rolled back.

Management and enforcement impacts – The operational capacity of most protected and conserved areas has been affected to some extent by COVID-19, although many countries are only just beginning to feel impacts as the virus spreads around the world. Often, the immediate response has been to reduce staff activity and vital management services, including ranger patrols. Reduced revenue and budgets for parks agencies may threaten employment for some park management staff in the future[9]. Travel restrictions have made it difficult for some rangers to get to work, for example in Ecuador half of all its rangers are thus affected[10]. Colombia is maintaining ranger activities but providing appropriate equipment to protect their health while also relying more on technology such as drones[11]. Rangers who were in the field at the time of the lockdown may now be unable to get home, or may be kept on duty to avoid the risk of rotating in additional staff (e.g. in Rwanda[12]): so they are held apart from their families for a prolonged period during this already stressful time. In other protected and conserved areas, management activities are operating at a lower intensity because of newly imposed expenditure constraints and cuts in staff numbers; or staff may be operating on reduced incomes (e.g. in Rajasthan, India, frontline staff have had a 30 per cent cut in their salaries for a three-month period[13]). In Brazil, at least one third of IBAMA, the Brazilian Environmental Agency, field operatives are close to 60 years of age or have medical conditions, making them more vulnerable to serious consequences from COVID-19 so they are not being sent on enforcement operations[14]. The significance of this is all the greater now that deforestation levels are peaking again in the Amazon and the next fire season is just

starting[15]. In some countries, rangers have been diverted to tasks that are part of the COVID-19 response, such as delivering aid and food to local communities, helping manage roadblocks and spraying inhabited areas with disinfectant[16].

In places where tourism revenue directly contributes to salaries and operations, ranger numbers and field operations have been cut, resulting in reduced enforcement capacity, and the abandonment or postponement of monitoring and routine management tasks[17]. This impact on employment may be especially severe in community conservancies and privately protected areas that depend heavily on tourism to pay staff salaries[18].

There are reports of increased poaching (both subsistence and commercial) and illegal resource extraction in countries such as Cambodia[19], India[20], Costa Rica[21] and southern and eastern Africa[22]; a tenfold increase in illegal logging is reported in Tunisia[23]. In Nepal, more cases of illegal extraction of forest resources, such as illicit logging and harvesting, took place in the first month of lockdown (514 cases) than in the entire previous year (483 cases)[24]; although data on poaching does not show a marked increase, an elephant and three critically endangered gharials were poached within the first 10 days of the lockdown. Moreover, six musk deer were killed in Sagarmatha National Park, in one of the worst recent cases of wildlife poaching in the region[24]. On the other hand, there are reports of significantly reduced poaching of rhinoceros in Kruger National Park and other protected areas in South Africa due to lockdown and travel restrictions[25]. It is important to note that hard data on poaching trends during the lockdown are not yet widely available.

There may well be differences among types of illegal exploitation. For example, high value transnational trafficking may be temporarily declining because of the lockdown and travel restrictions[26], whilst poaching for bushmeat, encroachment for grazing[27] or illegal fishing in marine protected areas may be increasing. In the Seychelles[28], Fiji[29], Indonesia, the Philippines and Hawai'i[30], there are reports of increasing fishing pressure in marine protected and conserved areas, which is encouraged by a reduced management presence. Lockdowns and travel restrictions along with reduced employment and livelihood opportunities mean local communities are increasingly depending on subsistence harvesting and foraging, which could potentially lead to overharvesting. This can be exacerbated when people return to their home communities from urban areas.

People have changed their behaviour in response to the pandemic. "Stay home — stay safe" sign in Dyfi Biosphere Reserve, Wales © Nigel Dudley

Visitation impacts – Protected and conserved areas in many parts of the world have been partially or completely closed to visitors as part of more widespread controls over the movement of people within and between countries. This means reduced visitor-related work for some sites, but increased visitor pressures on those remaining open[31]. A global picture of the extent of such closures is not yet available but, by way of example, World Heritage sites have been wholly closed to visitors in 72 per cent of the 167 countries with listed sites and remain fully open in only 10 per cent of these countries[32]. Many protected area systems have closed completely, while others have closed camping and day-use facilities, while keeping some hiking trails open[33].

Resource management impacts – Many activities, while important for conservation, are not deemed essential under some governments' guidelines which aim to discourage the movement of people over long distances[28]. As a result, park authorities may be less able to respond quickly to fires[34] or incidents of human–wildlife conflict, potentially resulting in increased hardship to communities and reduced tolerance to wildlife. Concerns for staff well-being also mean that work that is not considered immediately essential and which cannot be undertaken while physically distancing or without protective clothing, is not taking place[35]. This includes some types of scientific research and resource management which may be time-critical for effective conservation (Corlett et al., 2020). For example, following the catastrophic fires in Australia in late 2019 and early 2020, recovery planning has been disrupted by the COVID-19 restrictions[36], and researchers cannot undertake survey and monitoring work that will be vital to the effective recovery of more than 100 threatened

animal species requiring urgent intervention to prevent extinction. In Cape Verde, personnel undertaking cat eradication on the island of Santa Luzia have had to be evacuated because of COVID-19 restrictions, putting at risk the success of the reintroduction of the Critically Endangered Raso lark (*Alauda razae*)[37]. On the World Heritage-listed Gough Island in the South Atlantic, COVID-19 caused the postponement for at least a year of a major programme to control introduced mice that kill up to two million seabirds breeding on the island[38]. Research programmes in a group of private protected areas in Namibia have been temporarily shut down because of travel restrictions affecting researchers and a lack of funds derived from tourism[18]. Where managers of privately protected areas live at some distance from their protected or conserved areas (e.g. absentee landholders; Selinske et al., 2019), they may be less able to undertake critical management tasks or procure contractors for this purpose.

Social and community impacts – Indigenous people and local communities living in and around protected and conserved areas are extremely vulnerable to pandemics. They often live far from urban centres and have communal and sometimes nomadic lifestyles. This can lead to limited access to information and medical services[39], which are important in the context of novel viruses. The immunological profile of Indigenous populations can also differ from those of the majority populations living in the same region. Response to a new virus and disease may therefore be unexpected and even deadlier among such minority groups (Mesa Vieira et al., 2020). Many Indigenous communities fear a repeat of the devastation wrought by measles and other infectious diseases (Amigo, 2020). These risks may be exacerbated where the government response to the spread of COVID-19 is weak[40]. While a common response is to try to close off remote communities from outside visitors, a reduced management presence in protected and conserved areas can encourage illegal resource exploiters who can bring the virus with them into these otherwise isolated communities[41].

Many vulnerable, rural and marginalised communities dependent on income from small and medium-sized enterprises associated with protected and conserved areas are in danger of losing jobs and incomes[42]. In Nepal, the closure of Mount Everest's trekking and climbing has affected employment in local communities and Sherpas who had stockpiled supplies to support the high season have been left with no visitors to sell them to[43]. All around the world, the collapse of international and domestic tourism means that jobs are lost, salaries are cut, benefits and incomes disappear[44].

Policy challenges at national and regional levels

Many countries are taking on significant deficit financing to support their populations and businesses while they restrict activity to control the spread of COVID-19; many developed countries are committing more than 10 per cent of their GDP to this effort[45]. Governments are also reviewing their spending priorities in light of these radically changed budget positions. In some countries, operational budgets of environment (and other) departments are being reallocated to the pandemic response[46].

As governments seek to re-energise economies for a post-COVID-19 world, arguments for rolling back environmental protections are gaining traction, including provisions that would newly authorise or expand extractive industries and infrastructure in protected and conserved areas. Such 'emergency' rollbacks provide limited opportunity for public engagement. They are being proposed or enacted in a large number of countries, including in the United States[47], Greece[48], Canada[49], Malaysia[50], Albania[51], Brazil[52] and Kenya[53]. Such legal efforts to downgrade the protection given to protected areas, to reduce their size or even to de-gazette them entirely (Mascia & Pailler, 2011) will encourage deforestation, fragmentation and ecosystem disruption that are a major risk factor for the emergence of infectious zoonotic diseases.

Opportunities for a new focus on protected and conserved areas as global solutions

The responses from governments to COVID-19 have shown an unprecedented level and speed of policy and legislative action. At the same time, there have been dramatic changes to societal behaviour in reaction to this global pandemic. Can such resolve be applied to other global crises?

The source and spread of the disease could lead to some long-ignored environmental issues finally being recognised and resolved. For example, targeted bans on traded high-risk wildlife species would reduce the risk of further zoonoses, as well as having significant conservation benefits[54,55], although policies on trade will necessarily be nuanced by country and region.

Furthermore, the pandemic has focused the attention of the world on the connection between healthy nature and human health and well-being, and highlighted how reliant we are on nature, particularly for our mental health. In an increasingly urbanised world, parks are the gateway to nature for many of the world's population

Parks are a natural solution that can help secure human health and well-being; bushwalking in the Ovens River region, Alpine National Park, Victoria © Parks Victoria

and are a natural solution for securing human health and well-being. Nature can have therapeutic effects for people suffering the effects of social isolation. The mental health benefits derived from time spent in nature will also translate into economic benefits, such as avoided health care costs (Buckley et al., 2019; MacKinnon et al., 2019). In particular, urban parks and protected areas are becoming a lifeline for physical and mental health (Mell, 2020; Surico, 2020); this increased usage and interest could have additional benefits for protected and conserved areas and green space more generally.

The increased debt being accrued by governments is a significant impact of this pandemic. Yet there is an opportunity here for conservation organisations to work with governments and their debt holders to restructure debt through Debt for Nature swaps, thus using debt repayment to help finance nature protection. Debt restructuring such as the recent marine debt-for-nature swap, or 'Blue Bond', established in the Republic of Seychelles by The Nature Conservancy, the World Bank and the Seychelles Conservation and Climate Adaptation Trust[56], can help governments restructure mounting debt accruing during this time of economic crisis, yielding benefits for national economies as well as for nature. Trust Funds are another mechanism for long term financing for the management of both protected areas and indigenous territories[57,58]. A carbon tax with part of the revenue directed to protected area management such as that of Colombia is a further example of diversified funding (Barbier et al., 2020). Similarly, REDD+ payments can provide financing for protected areas as exemplified by Alto Mayo Protected Forest in Peru[59].

Most importantly, COVID-19 could spur the global community to a determination to address the other global crises of climate change and biodiversity loss, including through a heightened focus on protected and conserved areas. There is an extensive and robust body of scientific knowledge to help target investment on the most valuable ecosystems for the simultaneous pursuit of carbon sequestration, biodiversity and economic goals. There is significant policy opportunity to 'mainstream' and integrate nature protection into economic planning[60] as well as human health priorities. The potential for restoration of protected and conserved areas could provide a major boost to the UN's Decade on Ecosystem Restoration which is due to begin next year (Dudley et al., 2020). Nature protection should be seen as critical to sustainable economic growth and human

health – two priority issues that will dominate the global recovery agenda.

COVID-19 AND PROTECTED AND CONSERVED AREAS: EMERGING SCENARIOS

Based on the impacts, challenges and opportunities discussed above, we propose three potential scenarios for how the pandemic will impact protected and conserved areas and the role they could play in society's recovery.

Scenario 1: A return to normal

Under this scenario, the world learns to adapt to COVID -19 and strives to return to the old model of economic growth. There are scientific breakthroughs in the treatment of the virus and an effective vaccine is developed and shared globally. Although there is an economic recession of 1–3 years, there is a return to pre -COVID-19 levels of tourism and government support for protected and conserved areas. Support for conservation from NGOs and foundations also recovers. From a conservation perspective, we are in the same situation as before the pandemic, as described by the Intergovernmental Panel on Biodiversity and Ecosystems Services report (IPBES, 2019), where the challenges of biodiversity loss and climate change remain largely unaddressed. This means the global biodiversity outlook is still dire and we have lost time in actioning a post-2020 agenda under the Convention on Biological Diversity (CBD). There will still be significant underfunding for existing and new protected and conserved areas, and biodiversity will still be in decline, with up to one million species facing extinction (IPBES, 2019).

Scenario 2: A global economic depression and decline in conservation and protection

Under this scenario, the global pandemic lasts longer, or is more deadly than forecast. High levels of unemployment and shuttered businesses mean lower taxes for governments. There is a global economic depression, which results in a dramatic decline in all sources of conservation funding. Many people in urban areas lose their jobs and return to their rural home communities, thereby increasing pressure on natural resources. Tourism continues to be dramatically reduced and those protected and conserved areas and communities that rely on tourism revenues are starved of funds. Support from conservation NGOs and foundations decreases sharply with declining donations in contracting economies.

Globally most governments adopt massive stimulus packages to restart economies, but with a single focus on job creation. Environmental regulation is weakened, and conservation spending reduced. Nations look inward and political and financial support for international and multilateral institutions declines. Protected and conserved areas around the world are even more underfunded and there are few resources for the management or expansion of the protected areas estate, making areas more vulnerable to illegal activities. Indigenous and community conservation areas come under increased pressure for resource exploitation. Without effective management, human–wildlife interactions in and around protected and conserved areas become more problematic and more people and wildlife suffer. The work of the United Nations, inter-governmental bodies and the major international NGOs becomes increasingly marginalised.

At the same time, restrictions on economic development activities in protected and conserved areas are lifted, allowing more opening up of wilderness areas for extractive use and infrastructure development, and conversion to agriculture or other land uses. There is significant pressure in many countries to degrade or de-gazette protected and conserved areas. Biodiversity declines even more rapidly than before the pandemic, ecosystem services are lost and there is an emergence of more zoonotic diseases that drive other pandemics, spiralling into dangerous feedback loops. All this occurs in a world that fails to act on climate change.

Scenario 3: A new and transformative relationship with nature

Under this scenario, the pandemic results in significant changes in humanity's perception of our planet and our relationship to nature. Nations share a dramatic pandemic experience together, resulting in a shared bond with the planet and with each other. There is a new appreciation that the global pandemic is a result of the way consumer-driven societies are degrading and misusing nature. The central role governments have played in leading a societal response to a global crisis raises the importance of the collective in human consciousness. The pandemic raises global under-standing of the two intertwined major crises: climate change and biodiversity loss[61]. There is a new appreciation of the value of clear water and blue skies that have been an incidental benefit of the global pandemic shutdown. Science and its role in helping solve human problems have risen to the fore. The pandemic promotes a collective understanding of the immensity of the biodiversity and climate challenge, showing that transformative change is possible.

Oil prices fail to recover much, reducing profitability of the industry and creating the opportunity to shift away from fossil fuels. Under this scenario, governments and

Parque Nacional Zona Marina del Archipiélago de Espíritu Santo, Gulf of California, Mexico © Marc Hockings

their citizens see an unprecedented opportunity for the world to transition to a new, nature-friendly and climate-friendly future, including the protection and restoration of enough healthy natural land and sea to sustain all life on Earth.

While economic recovery will still be a global priority, it will be a green economic recovery. As governments seek to reboot their economies after COVID-19, vast sums of money will be invested. Nations decide to use this as a once-in-a-generation opportunity to correct the course of economic development towards more sustainable outcomes. Economists, central bankers and finance ministry staff from around the world have already identified natural climate solutions and rural support for ecosystem restoration as policies that will generate both economic multiplier effects and climate benefits (Hepburn et al., 2020). Increased investment in restoration would both help reverse degradation in protected areas and help re-establish connectivity outside and amongst protected areas. Such an investment strategy would put protected areas and conserved areas at its heart.

This scenario results in dramatic conservation actions by countries, ambitious new plans under the CBD and the United Nations Framework Convention on Climate Change, and an agreed global plan to help nature recover. International institutions are properly funded for the task. Natural or nature-based solutions involving protected and conserved areas and ecological restoration are seen as the preferred response to a range of human challenges, from biodiversity loss to carbon storage and sequestration, and from disaster risk reduction to improving human physical and mental well-being. Human populations get better at living with wildlife and reducing conflict. Healthy nature, stewarded in protected and conserved areas, is the backbone of a recovering planet, with diversified funding sources, including but not limited to sustainable tourism. Encouragingly, leaders from many parts of the planet, notably the European Union, Costa Rica, Finland, New Zealand and Canada, have already signalled their intention to embrace this opportunity in their recovery plans.

COVID-19 AND PROTECTED AND CONSERVED AREAS: A CALL FOR ACTION

Neither scenario 1 nor 2 offers a bright future for humanity. Scenario 3 is the only sustainable pathway and this Call for Action is a contribution to its delivery. The Call is made up of three elements: core principles, actions and a commitment from the IUCN's World Commission on Protected Areas. As the impacts of the pandemic evolve and are better understood, additional action may be needed by a range of stakeholders, including governments, the private sector and civil society.

Core principles to guide us

The COVID-19 pandemic has highlighted the urgent need to change the relationship between people and the natural environment, especially in the case of protected and conserved areas. A response to the current pandemic should be based on the following principles:

Principle 1: COVID-19 is a symptom of the wider environmental crisis arising from unsustainable economic processes which lead to the abuse of nature, including the degradation and fragmentation of natural ecosystems and the high-risk wildlife trade. Any response strategy needs to address all aspects of this environmental degradation, and include mechanisms which can contribute to combatting them, such as effectively and equitably managed networks of protected and conserved areas.

Principle 2: We must commit to and act to achieve a healthy, sustainable planet. This requires a One Health approach which crosses the human–animal–ecosystem interface, and for the global community to make the conservation of nature a central part of its responsibilities. An integrated response from all sectors – environment, health, finance, food, business and civil society – must become the norm, both now and over the longer term.

Principle 3: Protected and conserved areas provide broad benefits to society, but these are now under severe stress due to our societal response to COVID-19. Protected and conserved areas safeguard nature, but also protect us from the dangers of climate change and provide livelihoods and enhanced well-being, income, clean water, clean air and green spaces for everyone's physical and mental health. However, the current situation is placing enormous stress on many of these areas, and the collective response of relevant actors in the short, medium and long term will be crucial in determining their future.

Three phases of action

We call on the global community to come together for the rescue, recovery, and the rebuilding and expansion of the global network of protected and conserved areas. By global community, we mean governments at all levels and all relevant sectors, civil society and business.

1. Rescue: an immediate emergency response to cushion the shock from COVID-19

Maintain and invest in essential services: There is an urgent need to ensure the well-being of the protected and conserved area governance and management authorities, namely the managers, rangers, staff and volunteers. It may be necessary to control access to protected areas to minimise the risk of local communities, visitors and staff catching the virus. Special attention should be given to Indigenous peoples and local communities who are managing these sites or living around them. In many cases, this will include income support, as well as personal protection from the impacts of COVID-19.

Draw up and implement emergency plans: Operational levels of management and enforcement must be maintained or even enhanced in protected and conserved areas to achieve a level of effectiveness that sustains biodiversity and ecosystem services, and reduces the risks from human–wildlife conflict. Emergency protection plans should be drawn up and implemented to address poaching threats and other negative consequences of the pandemic. Such plans are vital where wildlife is likely to be susceptible to the pandemic, in particular non-human primates.

Provide emergency funding: Many protected and conserved areas that have seen major drops in income will need emergency financial support (along the lines of existing bailout packages for airlines, small businesses, etc.) to protect nature and to support the human populations that depend on these areas. Emergency funding plans should include support for the well-being and the food security of vulnerable communities managing, or living in or near, protected and conserved areas.

Maintain monitoring: Existing monitoring systems should be maintained wherever possible. New monitoring programmes should be developed to assess impacts of COVID-19 on, for example, visitor numbers, patrolling effort, human–wildlife interface, levels of resource harvesting, human–wildlife conflict, well-being of communities and ecosystem services. Monitoring of local fisheries and mariculture/aquaculture, as well as monitoring, control and surveillance measures for commercial fisheries, should be maintained to assist in the recovery, restoration and resilience of many marine and coastal protected and conserved areas.

Maintain existing laws: During and after this pandemic, national and regional governments should refrain from postponing, weakening or terminating environmental laws, regulations and initiatives, including those that affect natural ecosystems and protected and conserved areas.

2. Recover: a plan to overcome the damaging effects of COVID-19

Promote the health benefits of these areas: Moving past the immediate pandemic outbreak, it will be important to recognise and promote the role of protected and

conserved areas in sustaining human physical and psychological health, especially after a long period of lockdown or enforced isolation. Protected and conserved areas that allow visitation should aim to reopen where disease risks permit, using appropriate social or physical distancing rules.

Integrate health into recovery plans for these areas: Policies, management plans and practices need to be reviewed in order to reduce the risk of future zoonotic transmission. This means support for an integrated One Health strategy that examines and measures ecological integrity, wildlife health and public health needs in and around protected and conserved areas.

Create the foundation for sustainable finance: National economic recovery plans should include measures for the conservation and restoration of nature. International support will be needed for lower and middle-income nations. Any recovery strategy should recognise that many protected and conserved areas have been chronically underfunded, and that the world needs more of these areas with better levels of management rather than merely a return to pre-pandemic conditions. Support can take many forms, including direct economic stimulus through policies and sustainable finance options that generate economic multiplier effects. Where possible, the aim should be both to benefit protected and conserved areas and address climate change using natural solutions and support for ecosystem restoration.

Adopt a sustainable and equitable recovery: Restored and increased funding should ensure the re-establishment of conservation services and systems in protected and conserved areas, including rebuilding resource management programmes, re-employing furloughed staff and supplying back pay. It should support Indigenous peoples and local communities, women and youth living in and around these areas. Lasting conservation success can only be built on equity and benefit sharing.

Restore management capacity: Many protected and conserved areas are critically short of management capacity, and managers now face new challenges.

Large, well-connected, and well-managed protected and conserved areas will be an important element of rebuilding; Okavango Delta, Botswana © Marc Hockings

Capacity building is therefore needed in the management of protected and conserved areas, especially in sustainable financing, disaster preparedness, and integrated wildlife and human health approaches.

Avoid harm: Plans for restoration and new protected and conserved areas should apply a "Do No Harm" approach to ensure that economic recovery efforts do not support activities that threaten the environment or the well-being of Indigenous peoples and local communities.

3. Rebuild Stronger, starting now: a strategy to put protected and conserved areas on a more secure and effective trajectory

Help avoid a new pandemic: As part of a One Health approach, there is an urgent need to identify areas where there is a high risk of the emergence of zoonotic diseases and target these areas for integrated land-use planning and implementation. This should include the establishment of integrated monitoring systems for early detection of, and response to, emerging infectious diseases events. This will require improved collaboration between the environment, health, agriculture and land-use sectors.

Address wildlife trade from protected and conserved areas: Protected and conserved areas are a major source of animals taken from the wild, legally and illegally. In response to COVID-19, China temporarily banned the consumption of and trade in meat from most species of terrestrial wildlife, and there have been many calls to ban or restrict various forms of trade in wildlife more broadly. However, the context of wild meat consumption varies greatly around the world, and there may be unintended consequences of blanket bans. Strategies and plans for dealing with this issue in protected and conserved areas must be sophisticated and based on careful assessments of the local contexts and likelihood of unintended negative impacts.

Rights-based approaches: This time of change is also the moment to engage local communities and Indigenous people in more effective and equitable partnerships, and for governments to recognise and protect Indigenous peoples' rights to sustainable self-determination and effective conservation in their territories and in pursuing their own pathways to conservation and climate action. Increased funding is needed to support local communities in their efforts to sustain and rebuild livelihoods through the development of sustainable and resilient enterprises.

Innovative funding: Biodiversity is a global public good and biodiversity conservation should be funded as such. Innovative and diversified approaches are needed to ensure more resilient models of finance and management for protected and conserved areas, and dependent communities, so that they can better withstand future shocks and sustain the ecological resource base. The conservation of protected and conserved areas should be mainstreamed into every nation's central policies and decision frameworks for the production and consumption of resources. Greater investment in protected and conserved areas, and in communities as their effective stewards, would be a worthwhile insurance against future zoonotic diseases.

Set aspirational funding targets: The global community needs to be far more ambitious in terms of funding for nature, including protected and conserved areas. While developing a specific international target for funding the conservation of biodiversity will of course require research and negotiations between countries, the next Conference of Parties of the Convention on Biological Diversity could develop a target figure and promote it through the UN General Assembly. The internationally agreed target for development assistance – that economically advanced countries should aim at a net amount of 0.7 per cent of gross national product[62] – is a model that should be considered for conservation for the post-2020 Biodiversity Framework.

Strengthen the international framework for protected and conserved areas: Global treaties, notably the Convention on Biological Diversity and the UN Framework Convention on Climate Change, are fundamental in moving to a truly sustainable planet. In light of the effects of the COVID-19 pandemic, governments now need to come together under both Conventions to strengthen protected and conserved areas, so that these places can play their role in preventing future pandemics and building a recovery that benefits people and nature. A High Ambition Coalition for the upcoming Conference of the Parties of the Convention on Biological Diversity, including France, Germany and Costa Rica, is advocating for at least 30% of land and waters under protection by 2030.

WCPA commitment

The World Commission on Protected Areas (WCPA) will establish a Task Force to collect and analyse information on the impacts of COVID-19 on protected and conserved areas which will link with other work on COVID-19 by IUCN[63]. With others, we will develop, refine and promote the Call for Action. As global leaders on

protected areas[64], WCPA will develop principles and good practice for protected and conserved areas across the three phases of the response to the pandemic – rescue, recovery and rebuilding. In 2021, we will take these ideas to global policy meetings, including the IUCN World Conservation Congress, the Convention on Biological Diversity and the UN Framework Convention on Climate Change. We will collaborate on this agenda with other members of the IUCN family and promote a One Health approach to maintaining healthy ecosystems to governments, sectoral ministries, companies, human rights groups and others.

ENDNOTES

[1]*Protected area* follows the IUCN definition (Dudley, 2008). *Conserved area* is used here as an informal term to describe "areas sustaining ecological integrity and/or effective in situ conservation of nature" (Jonas & Jonas, 2019). Conserved areas include but are not limited to 'other effective area-based conservation measures' (IUCN-WCPA, 2019).

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[12]Pers. comm. Michel Masozera, Deputy Leader for Africa, Wildlife Practice, WWF

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RESUMEN

La pandemia del COVID-19 está repercutiendo de manera dramática en la comunidad mundial, en la vida y la salud de las personas, en sus medios de subsistencia, en sus economías y en sus comportamientos. La mayoría de las pandemias de enfermedades zoonóticas, incluida la del COVID-19, surgen de la explotación no sostenible de la naturaleza. Este editorial especial ofrece una instantánea de cómo las áreas protegidas y conservadas de todo el mundo están siendo afectadas por el COVID-19. Para muchas áreas protegidas y conservadas, los impactos negativos en su capacidad de gestión, su presupuesto y su eficacia son significativos, al igual que las repercusiones en los medios de subsistencia de las comunidades que viven en esas áreas y sus alrededores. Ofrecemos un comentario sobre la capacidad de los sistemas de áreas protegidas y conservadas, gestionados de manera eficaz y equitativa, para formar parte de una respuesta a la pandemia que disminuya las posibilidades de que se repitan acontecimientos similares, y se construya un futuro más sostenible para las personas y la naturaleza. Concluimos el editorial exhortando a la acción para el rescate, la recuperación, la reconstrucción y la expansión de la red mundial de áreas protegidas y conservadas.

RÉSUMÉ

La pandémie de COVID-19 a un impact dramatique sur la communauté mondiale, sur la vie et la santé, les moyens de subsistance, les économies et les comportements. L' origine de la plupart des pandémies de zoonoses, dont la COVID-19, provient de l'exploitation non durable de la nature. Cet éditorial spécial donne un aperçu de la façon dont les aires protégées et conservées dans le monde sont affectées par la COVID-19. Pour de nombreuses aires protégées et conservées, les impacts négatifs s'avèrent importants au niveau de la capacité de gestion, les budgets et l'efficacité, tout comme les impacts sur les moyens de subsistance des communautés vivant dans et autour de ces zones. Nous fournissons un commentaire sur la façon dont les systèmes gérés et équitables des aires protégées et conservées peuvent faire partie d'une réponse à la pandémie, en réduisant à la fois les risques de récurrence d'événements similaires et en construisant un avenir plus durable pour les habitants et la nature. Nous concluons l'éditorial par un appel à l'action pour le sauvetage, la récupération, la reconstruction et l'expansion du réseau mondial des aires protégées et conservées.