Template for the review of the document on scientific and technical information to support the review of the proposed goals and targets in the updated zero draft of the post-2020 global biodiversity framework

TEMPLATE FOR COMMENTS

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General comments

Specific comments		
Page	**Paragraph**	**Comment**
13	55	There is a wide range of scientific research that has focused on the topic of terrestrial and marine protected areas and that together serves as the substantial underpinning and justification for a global protected and conserved area target of at least 30% (currently Action Target 2 of the Global Biodiversity Framework). We have documented the most relevant of these papers, which we attach to this submission as Appendix II. Understanding that it is not possible to include a reference to every study, we recommend that at least a couple of the major literature reviews are referenced in this document to help underscore the breath of research conducted on this topic and the overwhelming scientific support for a protected and conserved area target of at least 30% protection. This should include the Effective Coverage Targets for Ocean Protection, which reviewed 144 studies and found that 37% of the ocean must be protected in order to achieve environmental and socio-economic goals, and "A Review of Evidence for Area-Based Conservation Targets for the Post-2020 Global Biodiversity Framework," which examined 70 papers in detail and found that there is ample support for the protection "of a minimum of 30% and up to 70%, or even higher" of the planet's land and ocean. Additionally, we believe that it is important for this document on scientific and technical information to explicitly take note of three other critical issues, each of which has been well researched and is essential to the consideration of the proposal to protect or conserve at least 30% of the planet: 1. **The contributions that Indigneous Peoples and Local Communities make towards biodiversity conservation.** As documented by Local Biodiversity

		Outlooks 2 and the IPBES Global Assessment, IPLCs are among the most effective at achieving biodiversity conservation outcomes, and there is significant overlap between IPLC managed territories and the current network of protected and conserved areas as well as the world's remaining intact natural areas. 2. **The socio-economic benefits of marine conservation.** An international team of 26 authors found that a substantial increase in ocean protection could have triple benefits, by protecting biodiversity, boosting the yield of fisheries and securing marine carbon stocks that are at risk from human activities. The experts identified specific areas that, if protected, would safeguard over 80% of the habitats for endangered marine species, and increase fishing catches by more than eight million metric tons. The study, published in *Nature* in March 2021, is also the first to quantify the potential release of carbon dioxide into the ocean from trawling, a widespread fishing practice—and finds that trawling is pumping hundreds of millions of tons of carbon dioxide into the ocean every year, a volume of emissions similar to those of aviation. 3. **The contribution of terrestrial and marine protected and conserved areas towards meeting our climate goals.** The above study on marine protected areas offers significant findings at the nexus between marine conservation and carbon storage, and there is a wealth of additional research that helps demonstrate how a dramatically increased network of protected and conserved areas is needed to help achieve the Paris Climate Agreement or otherwise help stabilize the climate, including A Global Deal For Nature: Guiding principles, milestones, and targets and A "Global Safety Net" to reverse biodiversity loss and stabilize Earth's climate.

Comments should be sent by e-mail to secretariat@cbd.int by 22 March 2021

Campaign for Nature

Appendix I.

Campaign for Nature is looking forward to the upcoming twenty-fourth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice. In advance of that meeting, the following serve as preliminary recommendations for strengthening the monitoring framework for the post-2020 Global Biodiversity Framework. As we approach the next negotiation sessions, we will continue to build on this, including by offering suggested revisions for target language.

IPLCs

We believe that to fully achieve Action Target 2 and protect at least 30% of the planet's land and ocean, IPLCs will have to be engaged as full partners. As a result, we believe that it is critical to add a component to this target that is focused on IPLCs and we would suggest the following language:

- "IPLCs are engaged as full partners in the design and management of protected and conserved areas, ensuring free, prior and informed consent and alignment with the UN Declaration on the Rights of Indigenous Peoples. "

Additionally, we would suggest adding several indicators.

- "Percentage (%) of PA/CA and OECMs actively implementing effective measures to recognise and respect the knowledge and rights of indigenous and local communities" *(This was highlighted by the CBD as an available indicator, and WDPA-NBSAPs was listed as the responsible institution)*
- "Number of countries having operationalised an effective, accessible and appropriate national level dispute/conflict resolution mechanism for indigenous and local community"
- "Number of countries with strong standards of Free, Prior and Informed Consent and partnership with IPLC partners"

Management Effectiveness

There has been improvement on this issue since the last version of the monitoring framework was updated, which we were pleased to see. However, we still believe that it is critical to continue addressing this point and to ensure that we have all of the necessary tools in place to determine to what extent protected and conserved areas are in fact delivering long-term conservation outcomes. To that end, it may be necessary to consider developing a new indicator and different monitoring approaches and tools. In the meantime, we recommend at a minimum strengthening the monitoring of this critical issue by adding the following existing indicator:

- "% of PAs/OECMs by area with documented ecological objectives" *(This was listed as available indicators where UNEP-WCMC and IUCN through PAME/WDPA would be the responsible institution)*

Financing

We believe that there are opportunities to strengthen the components and indicators associated with Target 18 in order to ensure that sufficient resources are mobilized and done so effectively. Specifically, we recommend adding a new component to Target 18, as follows:

- "Increase in international climate financing towards biodiversity positive Nature based Solutions"

To correspond with this new component, we propose adding the following indicator:

- "Proportion of official development assistance for climate finance aligned to biodiversity positive Nature based Solutions"

Additionally, we believe that it is important to specifically measure the amount of funding directed to protected and conserved areas (including protected areas, OECMs, and ICCAs), given that ensuring a sufficient level of financing is so critical to the ability to effectively manage protected and conserved areas and achieve long-term conservation outcomes. While this additional monitoring could also be associated with Target 18, we would recommend adding a new component to Target 2 ("Funding for protected areas and OECMs") and then adding the two following indicators:

- "Funding for PAs and OECMs from all sources,"
- "% of PAs/OECMS having at least 80% of their operational costs secured"

Campaign for Nature

Appendix II.

A Review of Scientific, Economic, Indigenous Rights, Health, and other Research Relevant to the Proposal to Protect or Conserve at least 30% of the Planet by 2030

In January 2021, a group of scientists from around the world issued a stark warning: “Humanity is causing a rapid loss of biodiversity, and, with it, Earth's ability to support complex life.” Viewed alongside other research, including the landmark 2019 IPBES report, the paper reinforces the urgency for the Convention on Biological Diversity (CBD) to approve an ambitious and transformative strategy to curb global biodiversity loss.

This document is intended to support Parties participating in the CBD negotiations by compiling, linking to, and summarizing some of the most relevant scientific, economic, rights-based and other expert analyses regarding biodiversity loss and climate change. It focuses in particular on research that relates to protected areas and the proposal to protect or conserve at least 30% of the planet by 2030 (30x30).

This 30x30 proposal has been incorporated in Action Target 2 in the Convention on Biological Diversity’s updated zero draft of the post-2020 Global Biodiversity Framework and is championed by over 50 countries in the High Ambition Coalition for Nature and People.

Specifically, this document compiles expert research across the following topics:

- Scientific evidence for an increased spatial target
- Evidence for a rights-based approach to conservation
- Economic implications of biodiversity loss
- Measuring the biodiversity funding gap
- Economic benefits of nature conservation and the 30x30 proposal
- Evidence for better linking climate and biodiversity strategies
- How nature conservation can prevent pandemics
- How Marine Protected Areas provide food security and other benefits to people

Scientific Evidence for an Increased Spatial Target

At the end of 2020, the world was closing in on the global target set in 2010 of protecting 17% of land and 10% of the ocean (Aichi Target 11), although additional progress is still needed to reach key qualitative elements of that target, including equitable and effective management and a focus on the most important areas for biodiversity. A growing body of scientific research has

shown that world leaders need to dramatically boost their ambition regarding protected and conserved areas, pointing towards a scientifically credible and necessary interim target of protecting or conserving at least 30% of the world's land and ocean by 2030.

- An analysis of existing studies concluded that between 25% and 75% of a typical region must be managed for conservation in order to protect the area's biodiversity.

- A comprehensive review of relevant literature found that, on average, 37% of a marine area must be protected in order to achieve environmental and socio-economic goals for the area goals.

- A survey of 335 conservation scientists from 81 countries found "very strong support" for conserving a large percentage -- "in the order of 50%" -- of the planet. The survey also revealed overwhelming agreement that the current goal of protecting 17% of the world's land and freshwater and 10% of the ocean isn't enough to conserve biodiversity.

- Leading scientists, including E.O. Wilson, have advocated for protecting half of the Earth, noting that such action would protect 85% of species from extinction.

- In another landmark scientific paper in *Science Advances*, over a dozen global experts noted the need to protect at least 30% of the planet's land and ocean by 2030, in addition to setting aside another 20% of the planet as "climate stabilization areas" that would be protected from large-scale changes in land cover. Achieving these targets, the experts said, would conserve biodiversity and help achieve the Paris Climate Accord goals.

- In 2019, 145 experts from 50 countries collaborated on the most comprehensive effort to date to assess the state of biodiversity worldwide. In the resulting report, the IPBES Global Assessment, the authors documented the extent of the problem and described what is necessary to reverse the global trend of biodiversity loss. One of the key recommendations was "expanding and effectively managing the current network of protected areas."

- The recommendation for protected areas in the IPBES report was echoed in the Draft Summary for Policymakers of the 5th Edition of the Global Biodiversity Outlook, which called for "major increases" in both the size and effectiveness of protected areas.

- A group of IUCN experts published a review of the literature on area-based conservation and concluded that there is ample support for the protection "of a minimum of 30% and up to 70%, or even higher" of the planet's land and ocean. The authors concluded that the call for 50% of the Earth to be protected "is supported by a range of studies."

- A study published in February 2020 in Ecography found that conserving 30% of land area cuts extinction risk in half among tropical plants, birds and mammals. The paper was authored by 21 leading biodiversity and climate scientists.

- A report published in May 2020 by Leopoldina, the German Academy of Science, suggested a ten-point action plan for the German government and the European Union to reverse biodiversity loss. One of the cornerstones of the plan is the establishment of effective protected areas on 50% of Earth's land area and 40% of the ocean. The authors further suggest that Germany and the EU strengthen their financial support for protected areas in developing countries and countries in transition to compensate for their external ecological footprint. As part of this financial support scheme, the authors recommended investing €4 billion annually in protected areas in Africa. They further called on the world community, the EU and Germany to establish a €35 billion fund to ensure the effective protection of the planet's remaining virgin forests.

- In an October 2020 report, the German Advisory Council on Global Change (WBGU), recommended fundamental changes in land management to better mitigate climate change, avert dramatic biodiversity loss, and make global food systems more sustainable. As part of five key multiple-benefit strategies, the authors recommended expanding protected areas to cover 30% of the Earth's land area while consistently applying internationally agreed quality criteria, and they further suggested that industrialized countries should devote more public funding, where possible in combination with private financing, to expand and upgrade protected-area systems both at home and in developing countries. In order to secure the valuable conservation effect of regions inhabited by IPLCs, the traditional rights and knowledge of these groups should be formally recognized by the UN and national governments.

- In September 2020, A "Global Safety Net" to reverse biodiversity loss and stabilize Earth's climate was published, calling for an area-based target of at least 50%. The Global Safety Net maps how expanded nature conservation addresses the overarching interrelated threats of biodiversity loss and climate change. This framework shows that, beyond the 15.1% land area currently protected, 35.3% of land area is needed to conserve additional sites of particular importance for biodiversity and stabilize the climate. Indigenous lands overlap extensively with the Global Safety Net, underscoring the central role that Indigenous Peoples play in conserving biodiversity.

- A March 2020 paper found that environmental change is rapidly accelerating, and that ensuring that protected areas cover a broad range of environmental conditions will be key in order to allow species to adapt. In order to support the adaptation of 19,937 vertebrate species globally, the authors find that the protected area target would have to be expanded from the current target of 17% to 33.8% of the total land surface.

- An April 2019 paper found that in order to minimize the extinction risk of the world's terrestrial mammals, 60% of the planet's land (outside of Antarctica) would require some level of protection.

- A November 2019 paper estimated the minimum amount of land needed to secure known important sites for biodiversity, finding that a minimum of 43.6% of land requires effective conservation attention.

- A recent paper analyzed scenarios for how terrestrial conservation could be optimized in order to advance outcomes for biodiversity, carbon, and water. The authors found that selecting the top-ranked 30% of areas would conserve 62.4% of the estimated total carbon stock and 67.8% of all clean water provisioning, in addition to improving the conservation status for 69.7% of all species considered. Protecting the top-ranked 50% would conserve 86.8% total carbon stock, 90.7% of all clean water provisioning, and improve the conservation status for 83.8% of all species considered.

Evidence for a Rights-Based Approach to Conservation

The identities, cultures, spirituality, and lifeways of Indigenous Peoples and Local Communities (IPLCs) are inextricably linked to biodiversity. Expanding the recognition of IPLC land rights is an effective, moral, and affordable solution for protecting our world and preventing the Indigenous rights violations that have historically plagued many traditional conservation strategies. Below is a summary of relevant recent research on this important topic.

- The IPBES Global Assessment stressed that Indigenous Peoples and Local Communities are critical to biodiversity conservation. The authors noted that 35% of all areas that are currently under formal protection and 35% of all remaining land areas with very low human intervention are traditionally owned, managed, used, or occupied by indigenous peoples. "Recognizing the knowledge, innovations, practices, institutions and values of indigenous peoples and local communities, and ensuring their inclusion and participation in environmental governance, often enhances their quality of life and the conservation, restoration and sustainable use of nature," the authors wrote.

- Indigenous Peoples, local communities, and Afro-Descendants — roughly 2.5 billion people — customarily manage over half the world's land, but governments currently recognize their legal ownership to just 10%, according to a recent report from the Rights and Resources Initiative. The authors describe how insecure, contested, and unjust land and forest tenure undermines international efforts to protect, manage, and restore nature. For these reasons, they conclude, governments are increasingly looking to recognize and strengthen the rights of Indigenous Peoples, Afro-descendants and local communities to their own lands.

- A report from the Rights and Resources Initiative makes the case for embracing a rights-based approach to conservation. The authors note that, while the current draft of

the Convention on Biological Diversity post-2020 Framework includes the goal of safeguarding at least 30% of the planet, it does not guarantee that the rights of Indigenous Peoples (IPs), Local Communities (LCs), and Afrodescendant (ADs) will be fully respected and promoted. If conservation actors, governments, and IPs, LCs, and ADs work together, the authors argue, this new 10-year global framework could actively redress conservation's colonial history and begin "decolonizing conservation" through community-led conservation approaches.

- An analysis published in 2019 found that lands managed by Indigenous Peoples in Australia, Brazil and Canada were slightly richer in vertebrate species compared to other protected areas. The authors conclude that partnerships with Indigenous communities can help to strengthen land protection for biodiversity conservation.

Economic Implications of Biodiversity Loss

Stopping biodiversity loss doesn't just benefit wildlife. It makes sense from an economic and financial perspective as well: protecting nature is good for everyone's bottom line. The following section summarizes important research on the economic implications of biodiversity loss.

- A 2014 study found that, every year, nature provides over $125 trillion worth of critical ecosystem services that underpin human wellbeing and economic development. These include providing clean drinking water and fertile soil, stabilizing the climate and pollinating the crops we eat. The study found that these ecosystem services are more than 40% more valuable than global annual GDP. However, these services are typically not priced and are not accounted for in global markets. That means that they are over-exploited and massively underfunded. The study also found that our destruction of nature results in an estimated $1.4 trillion of economic losses each year, equivalent to 1.6% of global GDP.

- The World Economic Forum's (WEF) 2020 Global Risks Report ranks biodiversity loss and ecosystem collapse as one of the top five risks in terms of likelihood and impact in the coming decade.

- In their January 2020 Nature Risk Rising report, the WEF estimates that $44 trillion worth of economic value generation – over half of global GDP – depends moderately or highly on nature and its services. They find that the loss of nature impacts business operations, supply chains, and markets.

- An analysis from Swiss Re Institute found that 55% of global GDP depends on high-functioning biodiversity and ecosystem services. The study revealed that one fifth of countries worldwide are at risk of their ecosystems collapsing due to a decline in biodiversity and related services.

Measuring the Biodiversity Funding Gap

There are clearly many benefits -- economic and otherwise -- of stopping biodiversity loss. But when it comes to financing the protection of nature, we're still far short of where we need to be. The following section summarizes recent research that helps clarify how big the biodiversity funding gap actually is.

- The UK Treasury's Dasgupta Review provides a useful economic framework for understanding how the global economy is embedded in nature and why our institutions and markets are failing to adequately value, invest in and protect nature. The report defines natural capital as an asset, similar to built capital and human capital, and describes how the world is mismanaging its portfolio of assets by under-investing in nature. This is due to institutional and market failures, including the failure to properly value the services that nature provides for free and the difficulty of defining and enforcing property rights. This situation is a classic example of the tragedy of the commons.

- A September 2020 report by the Paulson Institute, The Nature Conservancy (TNC) and Cornell University quantified the gap between current spending levels and how much is needed annually to protect the most important biodiversity and the services it provides and transition to a system of sustainable agriculture, forestry and fisheries. The authors calculated that this "biodiversity funding gap" is, on average, $711 billion per year, equivalent to 0.8% of global GDP. Current global spending on biodiversity is $133 billion, compared to a total need of $844 billion; that means we need to increase funding by more than a factor of five.
    - The report offers nine recommendations, grouped into three categories: reducing harm to biodiversity, generating new revenue, and catalyzing increased benefits by making different use of existing funds. Specific recommendations include reforming harmful subsidies; expanding green financial products; and increasing investment in natural infrastructure.
    - Historically, the vast majority of funding for biodiversity conservation has come from governments. While the report notes that there is great potential for the private sector to help close the biodiversity funding gap, government action is key. The authors conclude: "**The private sector can play a pivotal role, but governments need to pave the way**. Governments need to put in place the right regulatory environment, smart incentives, and market structures to catalyze financial flows from the private sector into biodiversity conservation, and to support private company efforts to promote sustainable agricultural, forest and fisheries production in their supply chains."

- The World Bank's 2020 report on the role of private finance for nature echoes the conclusions of the Paulson Institute/TNC/Cornell report and stresses that governments and regulators "hold the key to mobilizing private finance at the scale needed to transform the way we build, produce, and consume, in order to protect nature while fostering sustainable poverty reduction."

- The 2021 Little Book of Investing in Nature from Global Canopy draws on data from the Paulson/TNC/Cornell report and provides a simple guide for governments and policymakers on how to finance biodiversity.

Economic Benefits of Nature Conservation and the 30x30 Proposal

Recent studies have made clear that investing in nature conservation has positive financial and non-economic returns and can be a driver of, rather than a drain on, economic growth. This literature includes consideration of the proposal to protect at least 30% of the planet by 2030.

- In a report published in 2020, the World Economic Forum found that a transition to a nature-positive economy could generate up to $10.1 trillion in business value every year and create 395 million jobs by 2030.

- A 2020 report from The University of Cambridge found that protecting 30% of the world's land and ocean provides greater benefits than the status quo, both in terms of financial outcomes and non-monetary measures like ecosystem services. The authors concluded that these benefits outweigh the costs by a factor of at least 5:1. Based on the work of over 100 scientists and economists, the report is the most comprehensive global assessment of the financial and economic impacts of protected areas ever completed.

- McKinsey also recently completed an analysis of the economics of 30% protection in its Valuing Nature Conservation report. The authors found that increasing protected areas to 30% of land and ocean would support 30 million jobs in ecotourism and sustainable fisheries, directly add 650,000 new jobs in conservation management and support $500 billion of GDP in ecotourism and sustainable fisheries. Other benefits include reducing CO2 emissions by 2.6 gigatons annually, decreasing the risk of zoonotic diseases and more than doubling the protected habitats of endangered species.

- In Africa: The Conservation Continent, a collaboration between The Brenthurst Foundation and The Hailemariam and Roman Foundation, the authors argue that protecting biodiversity is critical to the post-Covid future of a prosperous, healthy and sustainable Africa. As African leaders consider the long-term imperative of economic diversification and transformation, they have important opportunities to allocate a significant share of land to conservancies, providing a new avenue for sustainable tourism. A big policy bet on the environment today could pay large dividends, and quickly, the authors argue. Furthermore, protecting biodiversity goes beyond direct income from tourism and travel; failing to act now means that pressures on the natural world will continue to threaten safe drinking water sources, long-term survival of wildlife, prosperity of remote communities, and nature's ability to protect us from future natural disasters, including pandemics and climate change.

- In Europe, the Natura 2000 Stress Test showed that the benefits of protection amount to €200-300 billion per year and far exceed the costs, estimated at roughly €6 billion annually. Investment in the Natura 2000 network of protected areas is expected to support as many as 500,000 jobs.

- A study of the economic impacts of the US National Park System found that it generated 340,500 jobs and $41.7 billion of economic output in 2019, a ten-time return on the $4 billion National Park System's annual budget.

- Nature and protected areas underpin the $427 billion US outdoor recreation industry, which represents 2.2% of US GDP and is growing faster than the overall US economy. The outdoor recreation industry contributes more to US GDP than the entire mining industry, including oil and gas extraction.

- There is also empirical evidence that the net present value of no-take marine protected areas can be between 4 and 12 times greater than the no-reserve counterfactual.

Evidence for Better Linking Climate and Biodiversity Strategies

Recent research has shown that stopping biodiversity loss goes hand in hand with protecting the climate. In fact, evidence is mounting that we cannot achieve one without the other.

- The Nexus Report, released in November 2020, concludes that "nature-based solutions" -- including large-scale protections for tropical forests and coastal ecosystems -- need to play a pivotal role in addressing the three biggest risks to humanity: biodiversity loss, climate change and the emergence of zoonotic diseases. The report offers concrete guidance on how to turn nature-based solutions into a "triple win" for biodiversity, climate change and protection against future pandemics. The authors underline the importance of striking a deal at the 15th Conference of the Parties to the CBD to protect at least 30% of our planet's land and ocean by 2030, while also setting a concrete and ambitious restoration target.

- Research from The Nature Conservancy and 15 other institutions found that natural climate solutions -- including reforestation and coastal restoration -- can provide over one-third of the cost-effective actions needed to keep global warming below 2°C.

- A review of marine studies found that fully protected (no-take) marine areas mitigate and promote adaptation to climate change. In particular, well-managed no-take MPAs help marine ecosystems and people adapt to five prominent impacts of climate change: acidification, sea-level rise, intensification of storms, shifts in species distribution, and decreased productivity and oxygen availability, as well as their cumulative effects.

- Sir Robert Watson, the only person to chair both the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), and the Intergovernmental

Panel on Climate Change (IPCC) summed up the importance of addressing both the biodiversity and climate crises in an Op-Ed in The Guardian that was headlined: Loss of biodiversity is just as catastrophic as climate change. "We cannot solve the threats of human-induced climate change and loss of biodiversity in isolation," he wrote. "We either solve both or we solve neither."

- Protecting, restoring and sustainably managing natural ecosystems, such as old-growth forests, marshes, mangroves and peatlands, could account for more than 30% of global action needed to avoid the worst climate scenarios. But currently, only 3% of climate finance goes toward natural climate solutions. However, not all nature-based solutions help biodiversity. Poorly planned tree plantations, for example, can do more harm than good.

- Research released in November 2020 by the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) underscores the size of the prize on offer from integrating action to save nature and combat climate change. The report finds that conserving 30% of land in strategic locations could safeguard 500 gigatonnes of carbon stored in vegetation and soils – around half the world's vulnerable terrestrial carbon stocks – and reduce the extinction risk of nearly 9 out of 10 threatened terrestrial species. The report stresses that coordinating priority areas to conserve both biodiversity and carbon stocks is key to meeting ambitious goals for both nature and climate. The authors stress that actions that capitalize on nature-based solutions and are based on inclusive decision-making that recognizes the rights of Indigenous Peoples and Local Communities are especially crucial to addressing climate change and biodiversity loss.

How Nature Conservation Can Prevent Pandemics

The COVID-19 pandemic has brought home the global importance of one of the most critical services that healthy natural areas offer humanity: a buffer against the outbreak of new diseases.

- The IPBES #PandemicsReport is one of the most scientifically robust examinations of the links between pandemic risk and nature since the COVID-19 pandemic began. The authors describe how policymakers can reduce the spillover risk of new pathogens by reducing contacts among wildlife, livestock and humans. Recommended measures include the conservation of protected areas and implementing policies that limit unsustainable exploitation of areas high in biodiversity.

- An analysis published in October 2020 found that effective and equitably managed networks of protected areas "can and should be part of the response to reduce the risk of future zoonotic pandemics." The authors state that, by maintaining ecosystem integrity, protected areas play a fundamental role in buffering against the outbreak of new diseases.

- In a July 2020 analysis published in *Science*, a group of 17 researchers found the increasing disease spillover rate into the human population is being driven by the unprecedented loss and fragmentation of tropical forests and the burgeoning wildlife trade. They assess the cost of monitoring and preventing this spillover, and conclude that the cost of prevention would be substantially less than the costs (both economic and in terms of human life) of responding to these pathogens after they have emerged.

How Marine Protected Areas Provide Food Security and other Benefits to People

Some might worry that expanding protected areas reduces the amount of food available to people living in and around those areas. But scientists have shown that the opposite is true.

- An international team of 26 authors found that a substantial increase in ocean protection could have triple benefits, by protecting biodiversity, boosting the yield of fisheries and securing marine carbon stocks that are at risk from human activities. The experts identified specific areas that, if protected, would safeguard over 80% of the habitats for endangered marine species, and increase fishing catches by more than eight million metric tons. The study, published in *Nature* in March 2021, is also the first to quantify the potential release of carbon dioxide into the ocean from trawling, a widespread fishing practice—and finds that trawling is pumping hundreds of millions of tons of carbon dioxide into the ocean every year, a volume of emissions similar to those of aviation.

- In a study published in November 2020, a group of researchers found that strategically locating marine protected areas (MPAs) in overfished fisheries can have important benefits for both conservation and the provision of food. They conclude that a strategic, 5% expansion of the existing global network of MPAs can improve future fish catch by at least 20%.
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- A study in press in *Nature* (to be published in March) also shows that fully protecting more of the ocean would produce multiple benefits, including enhancing food security, especially for low-income countries with overexploited fisheries.

- A study published in January 2021 documented the ability of marine protected areas to benefit local fisheries by analyzing lobster fisheries in southern California. The authors found greater build-up of lobsters within MPAs relative to unprotected areas, and show that a 35% reduction in fishing area resulting from MPA designation was compensated for by a 225% increase in total catch after six years, thus indicating at a local scale that the trade-off of fishing grounds for no-fishing zones benefitted the fishery.

- A new study on the social perceptions and ecological effectiveness of 18 partially protected marine areas and 19 fully protected areas compared with 19 open areas along 7,000 km of coast of southern Australia found that partially protected areas (which allow some degree of fishing) had no more fish, invertebrates, or algae than open areas; were poorly understood by coastal users; were not more attractive than open areas; and were

not perceived to have better marine life than open areas. In other words, only no-take areas restored biodiversity and delivered benefits to local people.