



Wildlife
Conservation
Society

ONE HEALTH IN ACTION

Pandemic prevention from the frontlines

EXECUTIVE SUMMARY

The **Wildlife Conservation Society (WCS)**, a global non-profit organization, saves wildlife and wild places worldwide through science, conservation action, education, capacity building and inspiring people to value nature. Established in 1895, WCS today maintains on-the-ground work in around 60 countries in Africa, Asia, the Pacific, and the Americas.

WCS has the largest health program of any international conservation organization. With over 100 years of hands-on veterinary medicine, disease surveillance and groundbreaking scientific research at the human-wildlife interface, WCS has helped pioneer the One Health movement highlighting the links between biodiversity and global health. In 2004, WCS convened an international symposium to discuss global health challenges at the nexus of human, animal, and ecosystem health which gave rise to the [the Manhattan Principles](#), calling for the recognition of “the essential link between human, domestic animal and wildlife health and the threat disease poses to people, their food supplies and economies, and the biodiversity essential to maintaining the healthy environments and functioning ecosystems we all require”.

In October 2019, shortly before COVID-19’s emergence, WCS and the German Federal Foreign Office led a follow-up meeting with global health leaders and issued the [Berlin Principles](#) on One Health: an “urgent call for a united effort to stop diseases threatening all life on Earth”.

Ecological degradation leads to biodiversity loss, exacerbates climate change and increases the risk of pandemic disease emergence. This document summarizes WCS’s transdisciplinary and multisectoral One Health collaborations and systems approaches to optimize health outcomes for all and reduce threats from emerging diseases, through:

1. Prevention and reduction of risk on the front lines of spillover and zoonotic disease emergence;
2. Early detection and surveillance; and
3. Preparedness for an effective response.

WCS prioritizes capacity building of local and regional partners, ensures best practices for social safeguards and protection of Indigenous Rights, and elevates science to inform policies and decision making.

WCS is dedicated to continuing and scaling implementation of integrated, transdisciplinary One Health approaches that reduce risk of disease spillover and emergence by committing to:

- **Reducing ecological degradation** by identifying and protecting highly biodiverse and intact ecosystems at the spillover frontline; actively supporting the efforts of government agencies responsible for managing protected areas and OECMs, and supporting the rights of Indigenous Peoples and Local Communities (IPLCs) whose stewardship over generations has conserved the largest remaining blocks of forest on earth.
- **Reducing risks** along illegal and legal wildlife trade chains through the development of surveillance networks and building of political commitment and capacity within regulatory and judicial agencies for strengthened legislation and enforcement.
- **Reducing demand** for wildlife consumption in urban centers through implementation of behavior change campaigns and supporting sustainable management of wildlife to ensure long term health, food and economic security of Indigenous People and Local Communities.
- **Supporting governments** to build surveillance systems from frontline communities, to national and transnational networks and developing and implementing efficient and innovative monitoring and testing technologies for wildlife and zoonotic diseases.
- **Identifying spillover pathways**, and **training** a wide range of stakeholders in safe and ethical wildlife sampling, behavioral risk research and laboratory testing.
- Using a **science-based approach** to inform policy decisions aimed at reducing risk and strengthening transdisciplinary partnerships and collaborations with national and international entities.



BACKGROUND

The overall decline of the planet's species and ecosystems, coupled with advancing encroachment of humankind into the planet's last remaining wild and intact places, has created increased opportunities for infectious diseases, as well as non-infectious threats to wildlife, human, domestic animal and ecosystem health. The majority of emerging infectious diseases (EID) of humans are zoonotic (i.e. pass between animals and humans), and the rate of zoonotic disease emergence is increasing. Over 300 EID events were documented between 1940 and 2004, and the number of EIDs caused by pathogens originating in wildlife has increased significantly with time, causing 72% of zoonotic diseases outbreaks since the 1940s (E.g., Ebola, HIV, SARS, etc.). In the Democratic Republic of Congo alone, there have been 5 Ebola Virus Disease outbreaks in the past 4 years, compared with 4 in the prior two decades. The rise in EID events is linked to the growing global human population, and the demands for food, land, and natural resources paired with unbridled consumption.

Substantial scientific evidence demonstrates the link between increased risk of pathogen spillover from wildlife and zoonotic disease emergence and activities that increase wildlife-human, and wildlife-domestic animal-human contact rates, including ecological degradation, deforestation, human encroachment into intact places, wildlife trade markets (legal and illegal), and intensification of livestock production. Highly biodiverse, tropical forested areas undergoing rapid land-use change have been identified as key hotspots for disease emergence.

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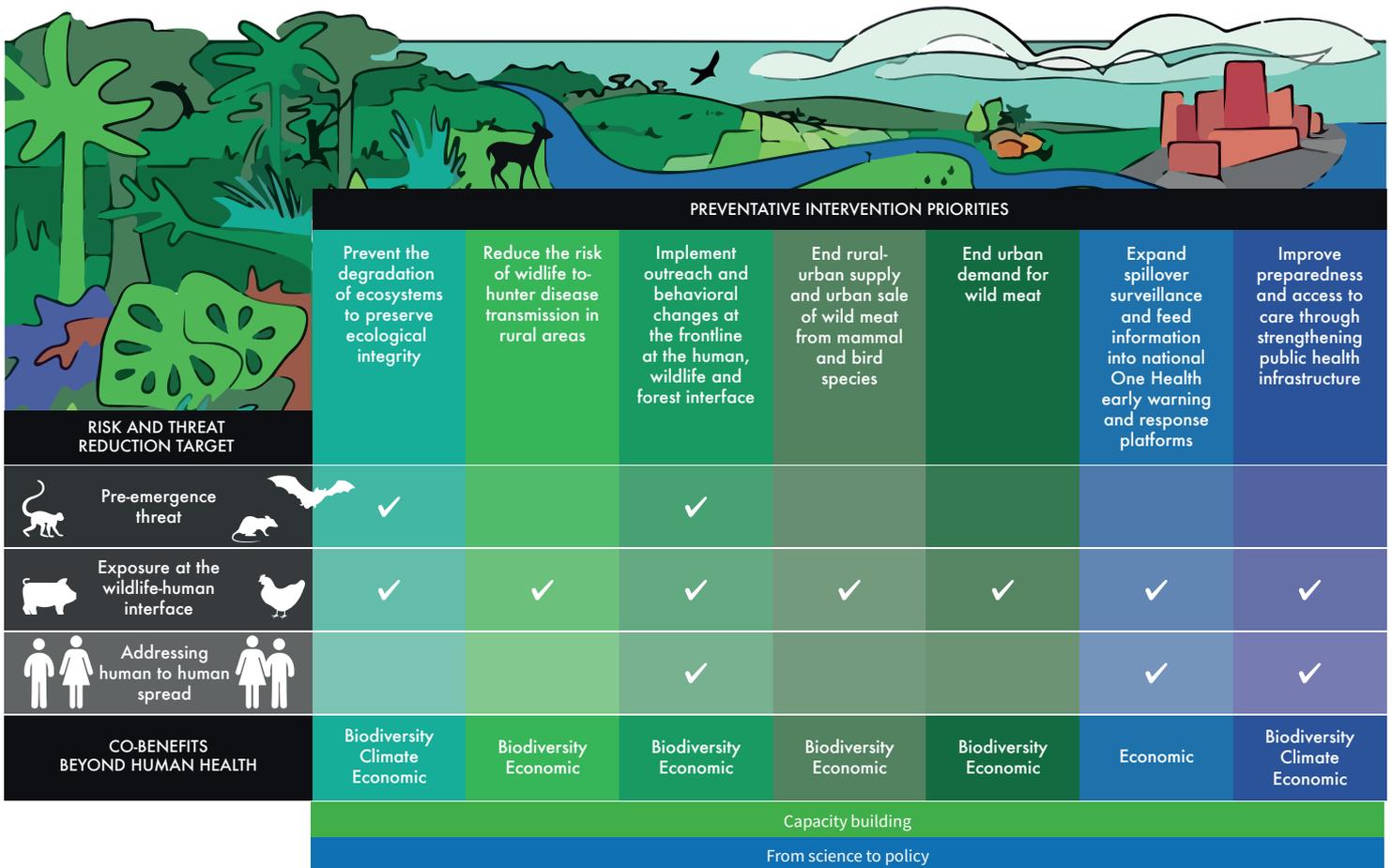
To reduce future emerging disease threats, we must re-emphasize and value the essential foundational role of intact and functional ecosystems for the health and well-being of all, and integrate ecosystem biodiversity conservation into prevention strategies at local, regional, national, and global scales.



IMPLEMENTING ONE HEALTH

WCS has worked with governments, scientists, local communities, and Indigenous Peoples to establish, expand, and manage protected areas, preserve intact landscapes, and reduce degradation in biodiverse areas for 125 years. Combining these diverse, long-standing relationships with our Health Program expertise, WCS is a global leader in the development and implementation of interdisciplinary and trans-sectorial monitoring, prevention, risk-reduction and mitigation of

emerging disease outbreaks at its biodiverse sites on the frontlines for spillover. WCS is also increasingly working in the detection and management of non-infectious diseases such as those linked to pollution. WCS prioritizes capacity building of local and regional partners, ensures best practices in social safeguards and protection of indigenous peoples' rights, and uses its strong scientific basis to inform policy and decision-making.





PREVENTION AND RISK REDUCTION

Reducing ecological degradation

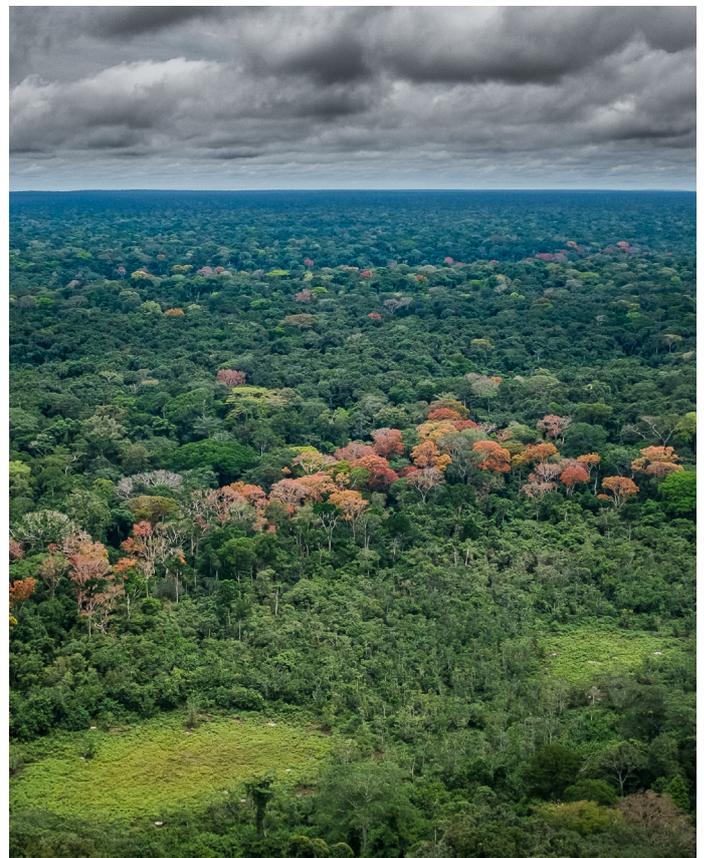
Recent studies and global mapping of outbreaks indicate that land-use change in tropical forest regions is one of the key risk factors for disease spillover from wildlife into humans. From 1940-2004, 34% of emerging zoonoses were found to be associated primarily with land-use change, and activities relating to extraction of wildlife for meat. Biodiversity decline and loss of ecosystem integrity play a key role in driving zoonotic outbreaks. To reduce these risks, WCS engages in **identifying and protecting highly-biodiverse and highly intact ecosystems** around the globe, particularly in tropical ecosystems where biodiversity is highest and the majority of novel zoonoses emerge.

Beyond the increased risks of pathogen emergence, the degradation of intact ecosystems exacerbates the effects of climate change and impacts of non-communicable diseases, and has negative repercussions on other aspects of human health, such as vector-borne and water-related diseases, nutrition and access to traditional medicines.

WCS is a major player in the conservation of ecosystems and sites of high biodiversity at the global level. **We collaborate with governments, Indigenous People and Local Communities in over 60 countries, supporting the protection and sustainable management of nearly 400 protected and other conserved areas, many of them in tropical, highly biodiverse ecosystems where the risk for spillover of zoonotic pathogens from wildlife to humans is highest.**

In addition, to minimize the degradation of ecosystems in or outside protected and other conserved areas, WCS provides scientific and technical expertise so that spatial planning and conservation efforts are implemented on the basis of solid scientific evidence, and guide decision-making and the establishment of adequate policies to combine development

and preservation of the integrity of ecosystems and biodiversity. We help, for example, the identification and preservation of areas of high conservation value (HCV) or high carbon stock (HCS) as well as the identification of corridors and areas at high risk of degradation at the forest-agriculture frontier. We make recommendations and support the implementation of concrete policies and actions with all stakeholders to ensure integrated landscape management, we support the capacity building of a broad range of actors, and support the sustainable management of resources from the local to the international scale.



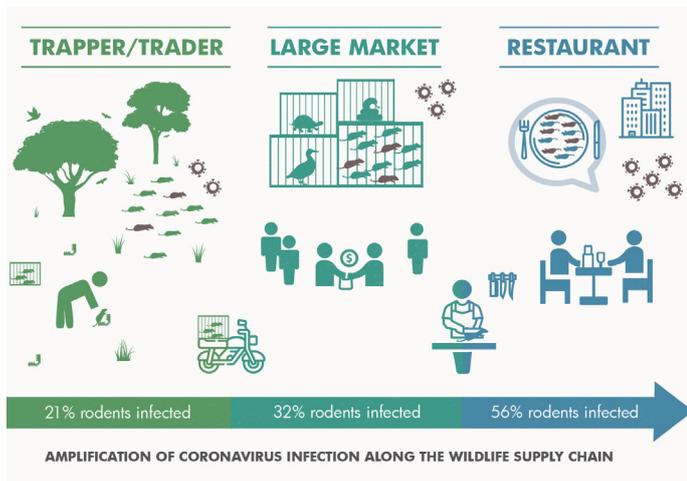
WCS and its partners have developed a new index to identify, in near-real time, **high integrity forests** on a global scale. This open-source tool can be used at local, national and global levels to inform decisions and policies aimed at reducing forest degradation. Such tools and associated analyses, inform WCS' recommendations and our **Forest-First approach**, which aims to identify areas at high risk of deforestation at the forest-agricultural frontier, and is already being applied in Indonesia. The Forest-First model has great potential to help guide policy and implementation of deforestation reduction strategies.



Reducing spillover from wildlife consumption and trade

While preserving ecological integrity is key to reducing zoonotic pathogen emergence, our work has demonstrated that removal of wildlife from the wild for commercial wildlife trade also poses a serious risk for disease emergence. Due to high wildlife-human contact rates, and large numbers of admixed species in conditions facilitating shedding and sharing of pathogens.

Our latest research in Vietnam demonstrates that this [risk increases along the value chain](#).



WCS engages with varied stakeholders along wildlife trade chains across Africa, Asia and South America, where we employ multiple approaches to promote efficient law enforcement and judicial processes to reduce the illegal wildlife trade.

This includes developing political commitment, supporting and building capacity within regulatory, enforcement and judicial agencies, and facilitating external pressure from international policy forums. WCS also supports the national operationalization of international treaties and conventions such as CITES.

When wildlife is hunted to supply markets in large remote towns, where wild meat is a luxury item and not essential, exploitation rates are generally unsustainable. The increase in bushmeat consumption in urban areas occurs at the expense of rural populations, whose food security depends on this vital source of food and protein, as well as of animal species, whose survival is all the more threatened. WCS therefore supports national governments in the development and implementation of targeted behavior change campaigns to reduce urban demand for wildlife, especially for human consumption.

The threat of pandemic emergence from legal wildlife trade is just as pertinent as that from illegal trade. Species such as bats, rodents or primates are known to harbor high numbers of zoonotic pathogens; nevertheless, they can be legally exploited or traded in many countries. Therefore, WCS is supporting amendments of policies and legislation to end the commercial trade in live, wild birds and mammals for human consumption in urban centers. This is aligned with the recent guidance from WHO, OIE and UNEP released in April 2021 calling: “to suspend the trade in live caught wild animals of mammalian species for food or breeding purposes and close sections of food markets selling live caught wild animals of mammalian species as an emergency measure.”



With the support of WCS, a campaign to reduce urban wild-meat consumption was launched by the government of the Republic of Congo in Pointe-Noire in 2019; the first led by a national government in Central Africa. This initial campaign has now been followed by one launched in [Kinshasa in April 2021 using positive messaging to celebrate Congolese cuisine, without wildlife](#).

Ensuring food and economic security for local communities

While potentially a source of pathogens, wild meat is also an essential and culturally significant source of protein, fat and micronutrients for Indigenous Peoples and rural communities in many parts of the world.

To tackle these issues while ensuring the health, economic and food security of rural communities, WCS works with over 200 Indigenous Peoples and Local Communities in Africa, Asia and South America to develop sustainable livelihoods, fishing and hunting practices, to ensure awareness of linkages of biodiversity and health, and support local land tenure and stewardship which is key to the success of sustainable natural resource management.

WCS is currently leading, the implementation of the [Sustainable Wildlife Management \(SWM\) Programme](#) in Madagascar, Papua-New Guinea, Democratic Republic of Congo and Republic of Congo in partnership with FAO, CIRAD and CIFOR. The project facilitates the adoption of safe and sustainable fishing and hunting practices, by and for local communities and supports appropriate development of alternatives to wild meat as a source of protein and income, whilst also reducing the demand for wild meat in urban centers where other alternatives are available. Successes include the establishment of poultry and fish farming around the Makira Natural Park in Madagascar, and Nouabalé-Ndoki in the Republic of Congo.



Agricultural expansion risks

Agricultural expansion and livestock intensification in areas of high biodiversity are also implicated as drivers of emergence of infectious diseases. WCS contributes to reducing the risk of disease spillover at the domestic animal-wildlife-human interface by collaborating with governments, farmers and ranchers to support appropriate land-use planning, promote appropriate agricultural and husbandry practices, and to build veterinary and One Health capacity.

In Mesoamerica, for example, [illegal cattle ranching is responsible for more than 90 percent of forest loss](#) in remaining wildlife strongholds. This is directly threatening wild habitats and local and Indigenous communities, while increasing interfaces for potential zoonotic spillover from wildlife to humans. WCS is supporting governments to limit expansion of cattle ranching into protected forests, and to monitor and manage diseases at the wildlife-human-livestock interface, ensuring not only ecosystem preservation but also protection of communities' health and livelihoods.



EARLY DETECTION AND SURVEILLANCE

Early detection is vital for a timely response to emerging disease threats. If wildlife health surveillance is to be effective, detection and reporting needs to happen as early as possible, and as close as possible to where a spillover event occurs. **For over two decades, WCS Health experts have worked to build surveillance systems with communities, and develop and implement increasingly efficient monitoring and testing technologies.**

Rural and remote communities are at the forefront of pathogen spillover, and are critical stakeholders for health monitoring at the front lines for disease emergence. WCS values the health surveillance insights of rural communities and works to ensure their understanding of zoonotic risks, protective health and hygiene measures, and to implement community, hunter and ranger-led early alert systems.

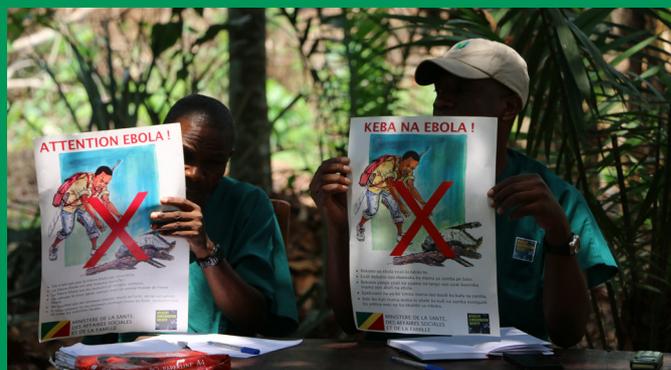
In addition, WCS is leading surveys to identify spillover pathways, assisting governments in the set-up of national and transnational surveillance networks, and training a wide range of stakeholders in safe and ethical wildlife sampling in a biosecure manner, behavioral risk research and laboratory testing.

Between 2009-2020, WCS was a lead partner in the [PREDICT](#) and [LACANET](#) projects. Through PREDICT, over 6,000 professionals in wildlife disease surveillance and One Health approaches were trained, including government and university staff, rangers, community members and scientists; and assisted national laboratories to identify over 1,100 viruses of which 140 were novel viruses, including zoonotic diseases of public health

concern, such as the Bombali Ebolavirus. [Project findings](#) and collaborations have been instrumental in guiding policy changes and in the creation of surveillance and pandemic prevention networks, such as [WildHealthNet](#) in Vietnam, Lao PDR and Cambodia, designed to integrate with national One Health platforms to facilitate rapid response.

Scientific and technological innovation is at the core of WCS actions. WCS co-led the development and implementation of the Spatial Monitoring and Reporting Tool (SMART), and recently created a Health module ([SMART for Health](#)) permitting collation of wildlife mortality observations with date, time, location and results of diagnostics performed. SMART is currently deployed in close to 1,000 sites, with >50,000 rangers trained in its use globally, representing an unprecedented network of eyes-in-the-field in biodiverse areas identified as hotspots for disease spillover and bearing enormous potential for worldwide implementation of a systematic, standardized and centralized wildlife health database.

Once wildlife or livestock carcasses have been identified as suspicious, it is essential that efficient diagnostic capacity exists. Thus, WCS is piloting new technological tools to ensure increasingly rapid testing combined with high biosafety standards. In Republic of Congo, the national laboratory we support now successfully handles analysis of ebolavirus.



In Northern Congo, WCS supports the implementation of a [hunting community-led early-warning system](#) that now covers 30,000 km² with more than 260 villages and 6,600 hunters in the Northern Congo Forest Landscape. The network has already proven valuable and has potential to be replicated across the region.

When a zoonotic disease outbreak occurs, it is essential that institutions have the capacity to respond quickly and to put in place safety measures at the local, regional and national level. While WCS's expertise is not tailored towards preparedness and mitigation for human health systems, we partner with relevant international, regional and national institutions to provide recommendations to minimize propagation at the wildlife – human – livestock interface.

Whilst centralized testing facilities are key for monitoring emerging diseases, in many places they are several days travel from sampling sites, limiting rapid response and risk reduction. WCS recently helped develop a portable diagnostic tool for real-time diagnostic testing for Ebola in the field (Biomeme Ebolavirus assay). The tool will soon be piloted in the Republic of the Congo, with potential roll-out across the region and beyond, facilitating swift implementation of safety measures. Future adaptation of the Biomeme and similar platforms for field-identification of other zoonotic pathogens of concern is already planned.



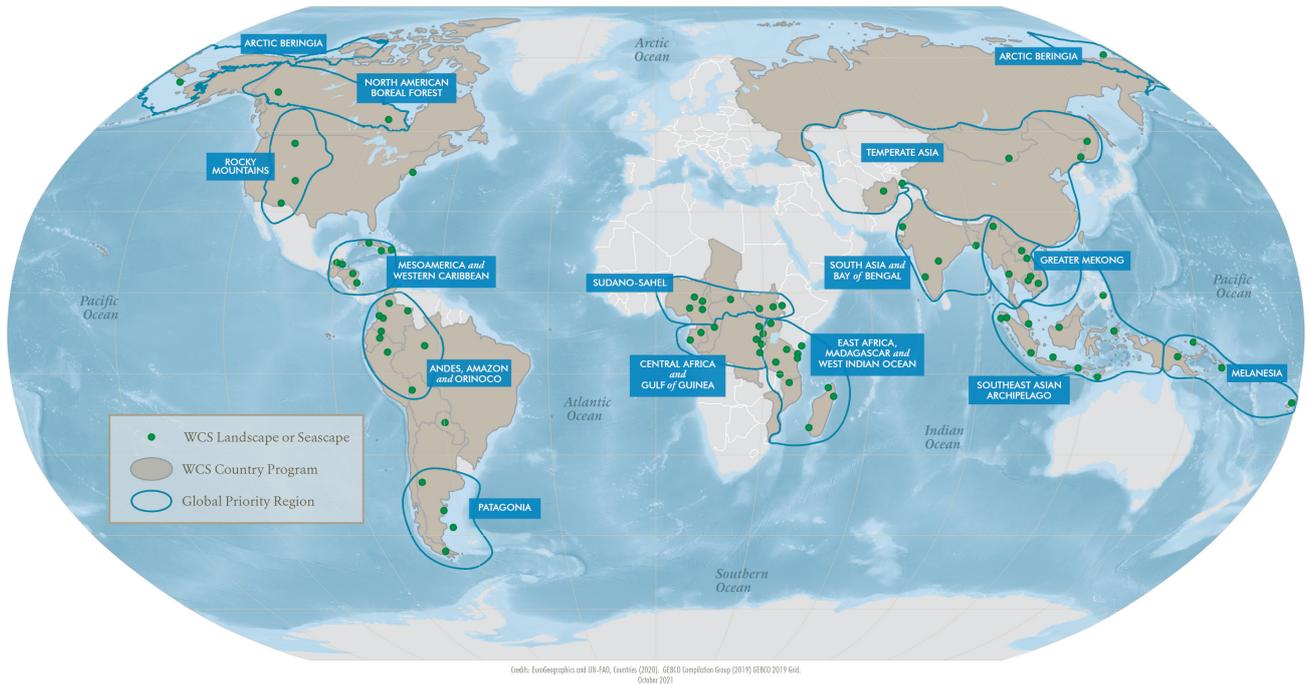
PREPAREDNESS AND MITIGATION

WCS engages with local partners to support the development of best practices in the case of disease emergence and trains government staff and agricultural communities to implement swift response. These efforts extend beyond wildlife and human pathogens, to include those that threaten rural livelihoods, for example : Peste des Petits Ruminants, African swine fever, Foot and Mouth disease and sarcoptic mange, in livestock in mixed-use landscapes from [Afghanistan](#), Mongolia and Southeast Asia to the Amazon basin, Andes and Mesoamerica. In [Melanesia](#), we support communities and government agencies in watershed management and the implementation of [WASH](#) programs, in order to mitigate the risks of emergence of waterborne diseases such as typhoid.

WCS also participates in preparedness and mitigation efforts through supporting improved access to health services for communities living in and around protected areas; often some of the most remote places on earth where such access can be challenging. Aid is multiform, from directly supporting construction or operation of health centers, to capacity building of health workers, conducting outreach, providing equipment or assisting with logistics to support quick implementation of safety measures. During the COVID-19 pandemic, WCS used a multi-pronged approach to directly [assist communities](#), to increase awareness and reduce spread of the disease; provide PPE; cope with the social and economic consequences of the pandemic and restrictions; and support pathways towards resilience.



WCS: Where We Work



OUR MISSION

WCS saves wildlife and wild places worldwide through science, conservation action, education, and inspiring people to value nature.

OUR VISION

WCS envisions a world where wildlife thrives in healthy lands and seas, valued by societies that embrace and benefit from the diversity and integrity of life on earth.

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