

Table of Contents

U.S. Senate Date: Wednesday, July 22, 2020

Committee on Environment
and Public Works Washington, D.C.

STATEMENT OF: PAGE:

THE HONORABLE THOMAS R. CARPER, A UNITED STATES
SENATOR FROM THE STATE OF DELAWARE 4

THE HONORABLE JOHN BARRASSO, A UNITED STATES
SENATOR FROM THE STATE OF WYOMING 10

CATHERINE SEMCER, RESEARCH FELLOW, PROPERTY AND
ENVIRONMENT RESEARCH CENTER

JONATHAN H. EPSTEIN, VICE PRESIDENT FOR SCIENCE
AND OUTREACH, ECOHEALTH ALLIANCE

DAN ASHE, PRESIDENT AND CEO, ASSOCIATION OF ZOOS
AND AQUARIUMS

STOPPING THE SPREAD: EXAMINING THE INCREASED RISK OF ZOOBOTIC
DISEASE FROM ILLEGAL WILDLIFE TRAFFICKING

Wednesday, July 22, 2020

United States Senate

Committee on Environment and Public Works

Washington, D.C.

The committee met, pursuant to notice, at 10:06 a.m. in room 406, Dirksen Senate Office Building, the Honorable John Barrasso [chairman of the committee] presiding.

Present: Senators Barrasso, Carper, Braun, Rounds, Sullivan, Boozman, Ernst, Cardin, Whitehouse, Gillibrand, Booker, and Van Hollen.

Senator Barrasso. I call this hearing to order.

Good morning. Welcome. We have three witnesses who are joining us today to discuss what occurred late last year, a new disease reported in Western China. Since then, COVID-19 has disrupted life around the world, taken hundreds of thousands of lives and devastated the global economy.

While much is still unknown about the origins of COVID-19, experts agree that it is a zoonotic disease, and that is the purpose of this hearing.

Due to the fact that a number of hearings are going on at the same time today, I am asking Ranking Member Carper to make his opening statement before I do, so that he can go participate in a markup that is happening at the Homeland Security Committee.

Senator Carper?

STATEMENT OF THE HONORABLE THOMAS R. CARPER, A UNITED STATES
SENATOR FROM DELAWARE

Senator Carper. Mr. Chairman, thank you very much for your kindness, and I want to say to Catherine, to Dan, and to Jonathan, thank you, welcome in person, and from a distance. We are delighted to see you and appreciate your presence and your testimony.

Mr. Chairman, thanks a whole lot for holding our hearing today, and while we have the Homeland Security Committee's meeting simultaneously right now with 28 bills in our markup, several of mine, so I am going to slip out for a while. I promise I will come back and ask some questions.

While I believe it is critically important that we examine the ways in which we can prevent future pandemics, I would be remiss if I did not begin by acknowledging the severity of our own ongoing crisis. To put it plainly, Americans are suffering as the Coronavirus continues to spread. We know that.

More than 500 Delawarrians have tragically lost their lives due to this disease, along with more than 140,000 other Americans, 140,000. To put those numbers in context, 25 percent of all COVID-19-related deaths that have occurred on this planet have occurred in our Country, despite the fact that Americans constitute less than 5 percent of the world's population. Think about that, 25 percent. Getting this deadly virus under control

and providing assistance to those who need it most must remain our primary focus.

With that said, experts around the globe have acknowledged the connection between wildlife trade and the emergence of COVID-19. I appreciate the opportunity that we have here today to examine and better understand that connection.

I have to be honest with you, Mr. Chairman and colleagues, in the Carper household, we don't use the word zoonotic every day. That is not an everyday source of conversation. We talk about baseball, the Detroit Tigers, and since the Tigers haven't given us much to talk about, recently at least, we have been spending a bit more time learning about some new things, and that includes zoonotic diseases.

People may tune into our hearing today and wonder, what is zoonotic disease anyway? They might not realize that these days, zoonotic diseases have become a matter of our everyday lives and a topic of our daily conversation. Zoonotic diseases are diseases that are transmitted from animals to humans. Believe it or not, at least 61 percent of human diseases are zoonotic in nature.

Some well-known examples of zoonotic diseases include the West Nile virus, Lyme disease, and rabies. Another example of a zoonotic disease is the 2019 novel Coronavirus, also known as COVID-19, or simply the Coronavirus. While we still don't

exactly know how the Coronavirus made the leap from wildlife to human beings, we do know that unnatural conditions in live wildlife markets in China known as wet markets likely played a role.

While tens of thousands of our own countrymen and women die from this virulent disease, it would be easy for us to simply point to the role that China and other countries play in wildlife trafficking and place blame. But the truth is that our Country also plays a significant role in the global wildlife trade. For example, wet markets exist in the United States, too. They are not exactly like the wet markets found in Asia and elsewhere, and they are not as prevalent, but they do exist, and they may pose a real risk to human beings.

As we consider the connection between illegal wildlife trafficking and zoonotic diseases, I hope we will not just place the blame on other countries, but rather do what is right by also reflecting upon our own practices here in the United States. We need to discuss how we as a Country can better support our own State and federal efforts to combat zoonotic diseases.

For starters, there is a lot more we can do as a Country to bolster research and encourage coordination regarding zoonotic diseases. To that end, I look forward to hearing ideas and advice from our esteemed panel of witnesses, particularly ideas

for the U.S. Fish and Wildlife Service, which is in the jurisdiction of our Committee.

We can also step up our efforts to support law enforcement in other countries and help those countries build capacity to combat wildlife trafficking. The United States can lead by example in this regard by working with other countries to reduce demand like we have done successfully in the past for highly trafficked parts such as animal parts, such as ivory.

Moreover, it is worth noting that some of the international wildlife trade that could contribute to the emergence of future pandemics is legal. When it comes to legal wildlife trade, the United States is, I am told, a top importer of live animals. Much of this global trade is economically important, sustainable, and poses little risk to human health, but perhaps not all of it is. We may need to make difficult decisions and fundamentally change some of the ways in which we interact with wildlife right here in the United States and around the world.

We know that natural, resilient ecosystems, when left to their own devices, thrive and support biodiversity. Biodiversity supports a healthier planet. But when we interfere and create unnatural conditions, the unintended consequences can sometimes be severe. For instance, wet markets increase the chance for disease transmission between species and then, ultimately to us, to human beings.

Climate change may also create problematic, unnatural circumstances. For example, resource scarcity driven by climate change will cause humans to interact with new animals. As such, new wildlife species will likely be traded, increasing the already-high risk for the spread of zoonotic disease. At the same time, as climate change continues to displace and disrupt both human and non-human populations, scientists expect that disease susceptibility will increase.

As we seek to prevent future pandemics caused by zoonotic disease, we would be wise to try and minimize the forces of uncertainty. We have learned that climate change will almost certainly bring with it more uncertainty to the management of zoonotic diseases, which is one more reason why addressing climate change is critical to the prevention of future pandemics.

When the United States addresses its shortfalls at home in the interest of creating a more perfect union and a better world, we need to send a strong signal to both friends and foes abroad when we lead by our example. That is precisely what I hope we will strive to do as we contemplate the next steps to combat wildlife trafficking and the prevention of future pandemics.

In closing, Mr. Chairman, thank you for this hearing. I want to thank our staffs, both on the majority side and I want

to thank Elizabeth Mabry, who is sitting behind me over my right shoulder for her passion on these related issues. Thank you so much. I will be back soon. Thanks.

[The prepared statement of Senator Carper follows:]

STATEMENT OF THE HONORABLE JOHN BARRASSO, A UNITED STATES
SENATOR FROM THE STATE OF WYOMING

Senator Barrasso. Thank you, Senator Carper.

To continue, zoonotic diseases are caused by germs, germs that spread between animals and humans, and can lead to many types of illnesses and even to death. Scientists estimate that about 75 percent of newer-emerging infectious diseases in people originate in animals.

COVID-19 is not the first disease to come from wildlife. HIV, SARS, MERS, Ebola, West Nile Virus, Lyme disease, are all examples of zoonotic diseases. A variety of factors increase the risk of an outbreak of these diseases, including illegal wildlife trafficking and unregulated wildlife trade, poor sanitation practices when handling raw or minimally processed meat that comes from wild animals, known as bush meat, changing land use practices, and global travel that makes it very possible for diseases to rapidly move from remote locations to urban centers and around the world in a matter of days.

Many countries facilitate illegal wildlife trafficking, unregulated wildlife trade, and poor sanitation practices when handling bush meat. They elevate the risk of spreading disease and should be held accountable.

China is one of the most egregious actors. According to a December 2018 report by the U.S.-China Economic and Security

Review Commission, "China is widely recognized as the world's largest market for trafficked wildlife products."

Chinese demand for trafficked wildlife has contributed to population declines of iconic species such as elephants, rhinos, tigers, as well as lesser-known species. For years, scientists have voiced concerns about China's poor sanitation practices when handling bush meat. Almost 15 years ago, the journal, *Current Opinions on Infectious Diseases*, published an article entitled "Infectious Diseases Emerging from Chinese Wet Markets: Zoonotic Origins of Severe Respiratory Viral Infections." It called these wet markets a unique place for transmission of zoonotic disease to humans.

In April, Secretary of State Mike Pompeo called on China to permanently close its wet markets, citing the "strong link between illegal wildlife sold in wet markets and zoonotic diseases." That same month, Dr. Anthony Fauci, Director of the National Institute of Allergy and Infectious Disease, told the morning news program *Fox and Friends* that the current public health crisis is a direct result, a direct result, of China's wet markets.

China announced a permanent ban on wildlife trade and consumption in February, but the action was met with skepticism. In an analysis it published in response to China's announcement, the Wildlife Conservation Society called it a good step, but

warned, a potential loophole for traffickers which may exploit the non-food exemptions to sell or trade live wildlife, creating additional challenges to law enforcement officers.

The skepticism, I believe, is well-founded. China took similar steps in response to the 2003 SARS outbreak, only to reverse them once the spotlight was off the crisis.

This committee has jurisdiction over the U.S. Fish and Wildlife Service, which has the primary responsibility for implementing the Convention on International Trade in Endangered Species, CITES, you know it well.

The Fish and Wildlife Service issues permits for the import or export of protected species. It also has domestic and international law enforcement and investigative responsibilities related to wildlife trafficking. Part of that work includes inspecting cargo for wildlife contraband and providing grants aimed at preventing wildlife trafficking.

This committee also has jurisdiction over the Endangered Species Act and the Lacey Act. The Committee has taken action to address illegal wildlife trafficking and unregulated wildlife trade. In 2019, the Committee successfully reauthorized the Multinational Species Conservation Funds, which provide grants to help conserve elephants, rhinos, great apes, tigers, from poachers and wildlife traffickers.

We also established the Theodore Roosevelt Genius Prizes.

These prizes provide cash rewards to encourage technological innovation to address challenges confronting wildlife, including protecting endangered species and preventing wildlife poaching and trafficking. We accomplished these and other important wildlife conservation priorities in the Wildlife Innovation and Longevity Driver Act, the WILD Act, which I sponsored along with Senators Carper and Inhofe and Booker and Boozman and Whitehouse. Totally bipartisan. The WILD Act was signed into law last March, March 12th, 2019.

I look forward to continuing to work with my colleagues to ensure China and other countries are held accountable and take appropriate action to minimize the risk of future disease outbreaks. Illegal wildlife trafficking, unregulated wildlife trade, and poor sanitary practices increase the risk of diseases spreading from animals to humans. China is the prime bad actor in facilitating the spread of such diseases and must be held accountable.

We are now going to hear from our witnesses, and I am delighted that all of you are here today. Catherine Semcer, who is the Research Fellow at Property and Environment Research Center, Dr. Jonathan Epstein, Vice President for Science and Research at EcoHealth Alliance who is joining us remotely today from Long Island, New York, and the Honorable Dan Ashe, who is well-known as a friend of this Committee and has testified over

the years, who is now President and CEO of the Association of Zoos and Aquariums.

I would like to remind the witnesses that your full written testimony will be made part of the official hearing record, so please keep your statements to five minutes so that we may have time for questions.

I look forward to your testimony, and I ask Ms. Semcer to please proceed.

[The prepared statement of Senator Barrasso follows:]

STATEMENT OF CATHERINE SEMCER, RESEARCH FELLOW, PROPERTY AND ENVIRONMENT RESEARCH CENTER

Ms. Semcer. Chairman Barrasso, Ranking Member Carper, members of the Committee. My name is Catherine Semcer, and I am a research fellow with the Property and Environment Research Center, a conservation research institute based in Bozeman, Montana.

Prior to joining PERC, I was part of the leadership team of a U.S.-based non-governmental organization that provides training, advisory assistance, and procurement services to African counter-poaching programs.

The United States recognizes wildlife trafficking, ecosystem degradation, and pandemic disease as interrelated threats to national security. Habitat destruction and direct human contact with some species of wildlife increases the risk of zoonotic disease transmission from wildlife to humans. So our environmental stewardship will determine whether or not the scale of these threats increases or diminishes.

This is especially true in regard to our engagements in Africa, where the potential for another pandemic to arise as a result of deforestation or wildlife trafficked out of the continent's wild lands is high.

Currently, Chinese investment influence over natural resource management in Africa threatens to remove the natural

buffer between humans and disease-carrying wildlife. Despite the efforts of the Chinese government to encourage environmentally responsible behavior among its companies and nationals working in Africa, their extensive involvement in deforestation and wildlife trafficking is putting more humans in direct contact with wildlife, increasing the risk of disease transmission.

For example, in the Congo Basin, where Chinese investment in the timber sector is high, recent research has shown the number of logging roads penetrating the rainforest has increased by more than 40 percent since 2003. Just this week, Malawi convicted seven Chinese nationals involved in the trafficking of pangolin scales, a crime believed to present an especially high risk of facilitating the spread of disease.

The longstanding efforts of the Chinese government to decrease involvement of their citizens in these harmful activities have not met with desired levels of effectiveness at the necessary speed to ensure our collective security. Despite demand reduction campaigns and outright bans on illegally harvested timber, ivory, pangolin, and other products, Chinese consumer demand continues to drive these activities.

China is the world's largest market for timber, and an estimated 75 percent of all raw logs exported from Africa are destined for the Chinese market. The 2020 World Wildlife Crime

Report issued by the United Nations earlier this month stated that China remains a leading destination for seized rhino horn and pangolin shipments.

The United States, through the programs of the U.S. Fish and Wildlife Service and other agencies, must take an increased leadership role in efforts to secure global health by conserving ecosystems and curtailing wildlife trafficking, especially in and from Africa. Policies under the Endangered Species Act can play a key role in delivering the necessary U.S. leadership.

Because many African nations rely on sustainable hunting programs to incentivize the habitat conservation and anti-poaching efforts, the regulatory obstacles created by species listing and hunting trophy import decisions can undermine the ability of African nations to maintain healthy ecosystems and combat wildlife trafficking at the beginning of the supply chain. Currently, sustainable hunting programs conserve an area of habitat in Africa that is more than twice the size of the U.S. National Park System. This conservation is an outgrowth of the economic incentives and revenues hunting generates for rural communities and private landowners.

Restrictions on the importation of hunting trophies into the U.S. stemming from the Endangered Species Act have caused the abandonment of at least 6 million acres in Tanzania that had been conserved from hunting revenues. Some of this land is now

being cleared for agriculture, resulting in ecosystem degradation and increased risk of viral spillover.

African wildlife authorities also derive significant revenue from hunting-related fees. In Tanzania, all of the anti-poaching operations of the Tanzania Wildlife Management Authority have been funded with hunting-related revenues, while in Zimbabwe, the Zimbabwe parks and Wildlife Management Authority derives 30 percent of its operating budget from hunting licenses and fees.

Improving the Endangered Species Act by requiring that listing and importation decisions take into account the ability of range nations to finance habitat conservation and field anti-poaching programs can strengthen the likelihood of containing bio-threats and interrupting the supply chain of trafficked wildlife at or close to its source. This will reduce the risk of disease spread and improve our collective security.

For these reasons, I encourage this Committee to consider these recommendations in future debates it may have on the Endangered Species Act. Thank you.

[The prepared statement of Ms. Semcer follows:]

Senator Barrasso. Thanks so much for your very thoughtful testimony. We appreciate it.

We are now going to head to Long Island, New York. Dr. Epstein, I appreciate you taking the time to join us. I know that you were prepared to come and visit us today, but based on issues that relate to returning to New York and a 14-day mandatory quarantine, we understand your reasons to want to stay on Long Island, but thank you very much for joining us today, Doctor.

STATEMENT OF JONATHAN H. EPSTEIN, VICE PRESIDENT FOR SCIENCE AND
OUTREACH, ECOHEALTH ALLIANCE

Mr. Epstein. Thank you, Senator Barrasso, and thank you very much for the invitation. I particularly appreciate the Committee's flexibility in allowing me to testify remotely.

I would also like to thank Ranking Member Carper and members of the Committee for holding this important hearing today.

My name is Dr. Jon Epstein. I am the Vice President for Science and Outreach at EcoHealth Alliance, which is a science-based non-profit located in New York City. For those of you who are unfamiliar, EcoHealth Alliance works globally with partners around the world to study the relationships between human and animal health and human activities that drive the emergence of new diseases, ultimately with the intention and effort to stop epidemics from happening.

As was mentioned earlier, and I think you set the stage very nicely for this conversation, the majority of emerging diseases are zoonotic, and about three-quarters of them come from wildlife, so wildlife plays an incredibly important role in our health. Diseases like the 1918 influenza, which originated in migratory waterfowl, HIV which originated in chimpanzees and other primates, SARS coronavirus, which was natural reservoirs, or bats, and now SARS-CoV-2, the virus responsible for COVID-19,

which likely also has an origin in bats.

However, it is important to mention that it is not the fact that wildlife carry disease, rather that it is human activities that increase our interaction with wildlife that drives disease emergence. So the global wildlife trade becomes very important. As we know, it is a complex and far-reaching multi-billion-dollar industry, transporting live animals and animal parts locally and globally for food, medicine, pets, clothing, and ornaments.

As mentioned, there are two facets to the wildlife trade that are both legal and illicit components; the latter, which is second really only to guns and narcotics in scale, and perpetrated by criminal and organized networks. In general though, whether legal or illicit, the wildlife trade increases risk of zoonotic disease emergence by bringing people and wildlife into closer and more frequent contact, beginning in local communities during the process of capturing animals, and ends with transport to wildlife markets, which may involve multiple species being carried together and intermingling. Then there is handling and butchering of animals, particularly in live animal markets.

There is some of the risk at every stage. The opportunity for viruses or bacteria that are carried naturally by wild animals to make their way from those natural hosts into either

other animal species or into people. It is particularly risky in crowded, urban wet markets, as was the case with SARS back in 2002, which emerged in Southern China, which gave the virus an opportunity to spread inside the market among different animals species, and then ultimately into people, before it made its way internationally through travel.

Although wet markets are common in Southern China, the reality is they exist all over the world. They are not unique to China, specifically, though the risks are similar wherever they look. Nearly every country in the world is involved in wildlife trade in one form or another.

In the United States and the global community, we continue to be vulnerable to zoonotic disease outbreaks, because there is a lack of effective surveillance for zoonotic viruses in wildlife, livestock, and people, particularly in the parts of the world that are most at risk for disease emergence, which inhibits our ability to rapidly detect and contain an outbreak while it is still localized, and before wider spread through travel can occur.

I thought it would be helpful to briefly discuss a study that we published, that EcoHealth Alliance published back in 2017, and I am just going to share my screen briefly and put an image up that I think many of you have in your briefing packets or hopefully can see in the room. Is this map visible?

Senator Barrasso. Yes, very clear, thank you very much.

Mr. Epstein. Okay, great. This comes from a study that looks at the drivers, or the factors that cause disease emergence, particularly zoonotic disease emergence. What you are looking at is a global hot spots map, which is really a map showing parts of the world that are particularly vulnerable to zoonotic disease emergence. The areas that are more yellow are higher risk.

This is a statistical analysis, a predictive analysis, that looks at things like biodiversity, species richness, human demography, livestock production, and dynamic processes that influence how we contact wildlife, like land use change. That can be deforestation or land conversion to agricultural land or urbanization.

What you will notice is that, well, two things. One is, we now scientifically now have a good understanding of where in the world we are likely to continue to see epidemics begin, based on these risk factors. Secondly, many of these areas around the world also overlap with wildlife trafficking hubs or origins. Parts of Asia, parts of Africa, and parts of the Americas, which to no surprise, particularly are areas where there is a lot of species richness and biodiversity, which tend to be sources for the wildlife trade.

All that is to say that we know where to focus resources,

both in terms of stopping pandemics from happening locally, but also understanding better some of the drivers that cause them.

The last thing I want to mention was that imported exotic animals and smuggled bushmeat increases the risk of disease introduction to the United States. A 2010 GAO report from the Department of Homeland Security and Government Affairs identified gaps in our ability to detect zoonotic pathogens in imported animals, due to a lack of coordination among federal health agencies and the absence of a single agency responsible for screening live animal imports for zoonotic agents. The report called for greater cooperation among federal agencies including the U.S. Fish and Wildlife Service, and cited the value of public-private partnerships with NGOs and universities helping to fill these gaps.

Today, these issues still remain, and there is an opportunity for this committee to expand the scope of the U.S. Fish and Wildlife Service to lead disease surveillance on imported wildlife, working in concert with the CDC, the Center for Disease Control and Prevention, the U.S. Department of Agriculture, and the USGS National Wildlife Health Center. This would significantly strengthen our capacity to detect zoonotic viruses at the U.S. border and possibly in other countries as part of a pre-border surveillance program.

I look forward to the opportunity to discuss specific ideas

about the U.S. Fish and Wildlife's involvement in disease surveillance in the course of today's hearing, and to answer any questions that the committee may have.

Thank you very much.

[The prepared statement of Mr. Epstein follows:]

Senator Barrasso. Well, thank you so much for joining us, and thanks for that very helpful testimony.

I would like to now turn to Mr. Ashe. Welcome back to the Committee.

STATEMENT OF DANIEL M. ASHE, PRESIDENT AND CEO, ASSOCIATION OF
ZOOS AND AQUARIUMS

Mr. Ash. Thank you, Chairman Barrasso, and Mr. Ranking Member Carper for this opportunity to testify today.

Addressing trade in live wild animals, legal and illegal, is an essential step in reducing the risk of pandemics. It is achievable, but U.S. leadership is essential. As many of the members and the witnesses today have said, we know that diseases spill over from other animals to humans. So it is no surprise that the COVID-19 pandemic is thought to have emerged from trade in wild animals, as did SARS 17 years earlier, MERS, Ebola, HIV-AIDS and many others that have been mentioned.

Our current crisis was predictable and preventable, and unless we learn from it and take stronger steps to understand and reduce related risks in trade, the same will be true of the next pandemic and the next. As the world population grows toward 10 billion by mid-century and we continue to fragment functional ecosystems, continue expanding trade and trafficking in wild animals, and literally turning up the heat on this global cauldron, we will see the risk and frequency of zoonotic diseases continue rising.

The root of the problem is unregulated and underregulated trade in wild animals, particularly for human consumption as food or medicine. This is generally independent of whether the

animals are threatened or endangered, whether they are removed from the wild or bred in captivity, or whether the trade is legal, illegal, sustainable, or unsustainable. The key is determining where and how the trade creates significant risks of disease spillover due to the numbers of animals involved, the crowded and unsanitary conditions and transshipment, and in markets, the related stresses on and illnesses in animals, and mixing of domestic and wild animals, both living and dead, risks that are likely elevated in illegal trade.

At this moment, our clear priority should be ending commercial trade in live wild animals for human consumption. It is no easy task, because globally the livelihoods and nutritional needs of millions of people are linked to it.

But of course I have a few thoughts on how we can begin. Number one, lead by example. Amend the Lacey Act to strengthen our government's ability to identify, designate, and stop injurious species including dangerous pathogens from entering the United States and from moving in interstate commerce if and when they arrive here.

Two, build a global regulatory framework to regulate this trade. I believe this is best done by amending the existing and successful Convention on International Trade and Endangered Species, or CITES, providing one overarching international framework to regulate trade in wildlife. The United States can

lead by building a coalition of like-minded countries to advance this effort, and this Committee can direct the U.S. Fish and Wildlife Service to engage and encourage the CITES Secretariat.

Three, continue expanding efforts to control illegal wildlife trade. The whole of government approach that began during the Obama Administration has continued during the Trump Administration. It should be supercharged to tackle the entire trade chain, increase enforcement capacity here and abroad, treat wildlife crime as serious crime, reduce demand and expand diplomacy.

Four, in large U.S. efforts in international conservation like the Central Africa Regional Program for the Environment or CARPE, run by the United States Fish and Wildlife Service, remove recently imposed sanctions and barriers on that program and support large-scale global initiatives like Campaign for Nature, to protect 30 percent of nature by 2030.

If we do these things, we can pressure and support other governments in permanently closing high risk wildlife markets while helping communities and wildlife live a healthier, coexistence, and transition to more reliable, affordable, and sustainable sources of nutrition. AZA accredited aquariums and zoos are experts in the trade, transshipment, care, and conservation of wildlife, and a safe and healthy interaction between wildlife and humans.

We stand ready to support and help you move this important issue forward.

Thank you very much, Mr. Chairman.

[The prepared statement of Mr. Ashe follows:]

Senator Barrasso. Well, thank you all for your testimony. I am very grateful you would take your time to visit on this important issue and share your remarkable expertise that each of you have. Let me start with some questions.

Ms. Semcer, the Chinese communist government has a history of deceiving the world, doing it when it comes to issues that are unfavorable to their country's ruling regime. China claims it is taking action to reduce demand for illegally trafficked wildlife, including banning the domestic trade of ivory, preventing the sale and consumption of wildlife.

Do you believe the Chinese government's efforts are having the desired impact when it comes to reducing the domestic demand for wildlife?

Ms. Semcer. Mr. Chairman, I would refer the Committee to the recent U.N. World Wildlife Crime Report issued earlier this month, which showed that China remains a leading destination for pangolin, for rhino horn. I would also refer the Committee to a recent report from the World Wildlife Fund showing that all demand for ivory within China has stabilized.

For those Chinese citizens who are able to travel abroad, consumption of ivory has increased by 10 percent between 2018 and 2019. As I said just a few minutes ago, despite the efforts of the Chinese government, they don't seem to be moving fast enough to achieve the desired effect.

Senator Barrasso. Dr. Epstein, are there some additional activities that you think the U.S. Fish and Wildlife Service should carry out to prevent the spread of zoonotic diseases?

Mr. Epstein. Yes, that is a great question, and I think there are certainly specific activities.

Following on the recommendations from that GAO report that I referenced, one thing to begin with would be an internal review of resource needs that would be required to implement wildlife disease surveillance. One of the things that we are seeing globally that is starting to change, but it is historically not been true, is that wildlife agencies historically have not been part of health response.

Clearly, there is a need for that. And there are also significant gaps in wildlife disease surveillance as it pertains to zoonotic disease. So the Fish and Wildlife Service by conducting internal review to see how there could be improved surveillance, disease surveillance, both at border and pre-border activities that they are conducting.

Also, to help identify and remove barriers to more effective coordination with other U.S. agencies. That is still something that we need to strive for, is coordination with our human health and livestock health agencies.

Another thing might be to expand U.S. Fish and Wildlife Service's mandate to lead on border surveillance and pre-border

disease surveillance to really work to make them the agency that takes charge for screening incoming live animals, particularly wildlife, for zoonotic disease, something that Mr. Ashe mentioned earlier.

Also, to work with partner countries, and particularly, wildlife and anti-trafficking agencies to develop and implement risk-reduction strategies for disease transmission related to wildlife trade and trafficking. There is already really excellent coordination with many wildlife agencies around the world, and this could simply be leverage to add on surveillance and screening activities.

Two other thoughts were that, it is important, and this was something that Dan brought up earlier, Mr. Ashe brought up earlier, which is that legislation alone isn't sufficient. We need to also work to reduce the demand for wildlife locally in other countries. U.S. Fish and Wildlife Service could play a role in working to really study and understand the sociological drivers that drive consumption of wildlife and work to reduce demand, while at the same time, stepping up enforcement and surveillance activities.

I don't want to take too much time; there are other ideas. But in short, I think really, seeing U.S. Fish and Wildlife Service expand their mandate and start to look at disease surveillance as part of their wildlife activities would be very

effective at helping protect both the health of Americans, but also global health as well.

Thank you.

[The prepared statement of Mr. Epstein follows:]

Senator Barrasso. Thank you.

Ms. Semcer, the climate created by the Coronavirus has led to some calls to ban trophy hunting. In September 2019, however, you wrote an article entitled "Conservationists Should Support Trophy Hunting." In that article, you mentioned how 132 researchers joined you in an open letter that was published in Science Magazine, recognizing that trophy hunting operations in the Sub-Saharan Africa area have provided incentives to conserve an area of wildlife habitat more than two times the size of the United States National Park System.

Could you explain to us how trophy hunting conserves land, and in turn, reduces the risk of zoonotic disease spillover?

Ms. Semcer. Yes, Mr. Chairman. The safari hunting trade in Africa provides economic incentives for the conservation of habitat, particularly in rural areas. It does this through a number of means: cost-sharing agreements between safari hunting operators and local communities, for example in Zimbabwe, in what are known as the Campfire Areas, local communities get about 50 percent of the proceeds that come from safari hunting operations.

Because of this injection of cash, they then have an incentive to conserve the habitat that the safari hunting operators require to conduct business. That cash has added health effects in that it often goes to create infrastructure,

such as development of clean water sources, which is key for doing something that we take for granted, like washing our hands. Similarly, it can be used to build health clinics, which can serve as the early warning system when disease outbreaks do occur.

Senator Barrasso. Thank you, all of you, for your answers. I am now just going to turn to Senator Cardin, who is with us remotely.

It appears that he has stepped away for a moment. Senator Gillibrand, if you are on, I would like to turn the time over to you, please.

Senator Gillibrand. Yes, I am here. Thank you.

Mr. Ashe, you mentioned that if we are to effectively address the global threat of zoonotic diseases, we need a global regulatory framework to mitigate the risk. I wholeheartedly agree with that approach, and believe that we must take a similar approach at home.

That is why I am a cosponsor of the Advancing Emergency Preparedness Through One Health Act, which would improve public health preparedness by ensuring Federal Agencies advance a one health approach to prevent and respond to future outbreaks. Bridging the gap between research and response is critical to mitigating future human and animal spillover events.

In your experience as a former Director of the U.S. Fish

and Wildlife Service, what type of agency coordination seems to be working well, and two, what gaps exist in our current approach, and what can Congress do to fill those gaps?

Mr. Ashe. Thank you, Senator Gillibrand.

The kinds of things that work well are the efforts that are the most collaborative, and you mentioned that. I think we have joined with States and universities and health organizations to tackle issues like Chronic Wasting Disease or Lyme disease. I think we have done extraordinarily well.

I think the gaps often, most often, in my view, are the resources to support that kind of work. So I think as we look forward, both internationally and here in the United States, I think the resources to build the framework to support that kind of collaboration and the science that is needed to drive the decisions that need to be made in the context of those collaborative efforts.

So there are plenty of examples of success here in the United States, but we need to support that success, we need to build upon it. We need to expand it and export it globally so that we can bring the same expertise, the same capacity, the same vision to efforts internationally.

Senator Gillibrand. Thank you.

For the entire panel, how does the U.S.'s withdrawal from the World Health Organization affect U.S. participation and

engagement in improving international disease surveillance efforts and combating the illegal wildlife trade and wet markets?

Mr. Ashe. I will begin by saying, again, in continuation of my recent answer, I think international cooperation is going to be essential in dealing with these. We can't push off international organizations; we need to bring them together.

I testified in support of the Convention on International Trade and Endangered Species as kind of one coordinated effort to regulate trade and wildlife, but the World Health Organization will bring expertise to that regulatory mechanism.

So I think what this Coronavirus pandemic is showing us is that we need to cooperate like we have never cooperated before, because we can't solve these problems from within the United States borders. We have to work internationally if we are going to be successful.

Mr. Epstein. If I may, I would like to build on that, too. I agree wholeheartedly that cooperation with intergovernmental agencies is necessary, because they have trust and relationships and authority as experts with so much of the world. The WHO in particular has been a proponent of one health approaches to disease surveillance and response and work closely with counterparts and other intergovernmental agencies, such as the World Organization for Animal Health and the IUCN, as well as

universities and U.S. federal agencies.

So that relationship is really important in terms of really being able to not only conduct research activities to understand disease risk, but also to help implement policy change that is going to reduce the risk of diseases emerging.

Senator Gillibrand. Dr. Epstein, can I ask you another question? As you know, emerging infectious disease risks associated with wildlife trade continue to be the largest unmet challenge of current disease surveillance efforts.

In your testimony, you indicate that more surveillance of wildlife internationally is needed if we are to fully understand the extent of the role wildlife markets have played in the COVID-19 pandemic. Are there the steps that you recommend that the U.S. take to approve global surveillance efforts? How do you recommend prioritizing investments in surveillance efforts? For example, is viral discovery through wildlife surveillance more of a priority than establishing disease surveillance across communities likely to be in or near spillover hot spots?

Mr. Epstein. That is a fantastic question, thank you.

The answer is, yes, absolutely. Understanding what is out there in nature, the diversity of viruses, and understanding which among those should be paid closest attention to in terms of their potential to emerge in human populations will help guide strategies for mitigating risk.

But that has to be done in concert with sociological and behavioral research that understands where the high-risk behaviors are occurring, in parts of the world such as I showed with the hot spots map where we already know there is increased risk for disease emergence. So we can prioritize and target interventions and strategies by understanding where the risk is, understanding where we need to be paying attention in terms of the types of wild animal species that are likely to carry zoonotic viruses, and the areas where people and wildlife and domestic animals have the most contact where those viruses are most likely to spill over.

That is how we can effectively get at reducing that risk. That requires cooperation and collaboration with local governments, local scientists, and agencies within country that have the best understanding and knowledge of the local context and circumstances.

Thank you.

Senator Gillibrand. Thank you, Mr. Chairman. Thank you, Mr. Ranking Member.

Senator Barrasso. Thank you very much, Senator Gillibrand.

Senator Braun?

Senator Braun. Thank you, Mr. Chairman.

The importance of this topic is not only for the health considerations, but over a period of time, rural economies,

especially any landowners that have wooded property, a significant amount of income comes from leasing hunting rights. I think that the magnitude of what we are talking about here, especially when I look at the statistics at how prevalent it is for something to jump from one species to ours and highlighted by what we have seen just recently and what we are dealing with, it is almost staggering to think about the implications.

I know in our State of Indiana that we are surrounded, for instance, by Chronic Wasting Disease, which I think, up to this point, has not been proven to jump from a deer into a human being.

But I guess what bothers me mostly would be in the infrastructure, at the grassroots level, when it comes to the various State departments of natural resources, which is what ours goes by, then various divisions within. What is that leading edge of where we are actually going to find out about this before you find out about it the hard way, like we have with COVID? What is that structure like in this Country, and how prepared are we to recognize it and do something about it? That would be for any of the panelists.

Mr. Ashe. Senator, I think the most important ingredient is awareness, and then the dedication to attack and solve the problem and the resources to do that. Again, with Chronic Wasting Disease, there has been an enormous effort between the

State fish and wildlife agencies and the U.S. Fish and Wildlife Service and the U.S. Department of Agriculture to learn about Chronic Wasting Disease, how it moves, how it spreads among white tail deer populations, and what to do about it.

So I think the first thing is awareness, that these are risks, these are substantial risks involved in the movement and the use of animals, particularly wild animals, particularly for human food. We need to learn more about them; we need to build the institutional frameworks to fund the scientific endeavors to evaluate risks, to identify and evaluate risk.

Then we need to build the regulatory mechanisms to control that risk. I think that is the major lesson to me.

Senator Braun. Anyone else want to weigh in? If not, I have a question. What is the most recent example of something that has actually leaped from an animal to a human being that we have caught here in this Country, and what was the result of it, and how well did we respond to it?

Mr. Epstein. Perhaps I could start with that. One recent example would be West Nile Virus, which was introduced into the United States in 1999. It is an infection that is carried by birds and spread by mosquitos, and it not only can impact people, but also other animals, causing severe encephalitis.

When that was first started, was first discovered in New York, in fact, at the Bronx Zoo, some of the animals in the

collection were dying from it. But it quickly spread across the Country to all of the States, and research jumped on that.

Our response, collectively, was to understand what the reservoir was. This was recognized as a virus that typically existed in Africa, and this was the first incidence of it here in the United States.

It turned out that at least in the eastern part of the Country, robins were a reservoir for this virus, and mosquitos that were transitional and birds. But also mammals, including people, were a bridge vector that was driving transmission. In understanding that, we were better able to work toward vector control, mosquito control, diagnosing West Nile Virus in patients that were presenting to hospitals with encephalitis, and tracking the spread of the virus across the Country.

Unfortunately, it was very difficult to stop the spread, and it made it across the Country. Nonetheless, that was an example of awareness of the introduction of a zoonotic disease, which is now endemic here.

Senator Braun. Thank you.

Senator Barrasso. Thanks, Senator Braun.

Senator Whitehouse?

Senator Whitehouse. Thank you, Chairman. Thank you for this timely hearing, or perhaps maybe untimely hearing.

A couple questions. First, Ms. Semcer, which international

forums or organizations do you think are most effective and should be getting supported by the United States as a matter of our leadership on this issue?

Ms. Semcer. I believe our continued engagement in the Convention on International Trade and Endangered Species is absolutely critical to addressing this issue. I would also offer that we should begin more bilateral engagement with our partners in Africa and elsewhere, where there is a high risk of zoonotic disease emergence so that we can tackle this problem not just multilaterally, but bilaterally.

Senator Whitehouse. The role of the World Health Organization?

Ms. Semcer. As I said in my earlier testimony, I think that what we have seen happen is indicative of the need for greater U.S. leadership on this issue. We cannot count on other countries to succeed in deterring the spread of zoonotic disease through demand reduction campaigns and even outright bans on consumption.

Leadership requires engagement. Whether or not the World Health Organization is the appropriate form for such leadership and engagement is beyond my area of expertise, but the U.S. must engage with the rest of the world on this issue if we are to confront it.

Senator Whitehouse. Dr. Epstein, what is the next virus

that you are worried about? Is there one that you have got your eye on that has not yet popped up into general circulation that is something that concerns you?

Mr. Epstein. That is the million-dollar question, isn't it? I will say that collectively, as a group, coronaviruses remain a concern in that we know that there exists a diversity of viruses related to SARS and to SARS-CoVi-2, and continue to circulate in bat populations around parts of Southeast and Eastern Asia. There is still of a risk of those emerging again, and so that is one we need to keep an eye on.

I think influenza viruses also remain a concern. Those circulate annually and evolve continuously, and still have the potential to cause a pandemic, so flu viruses are important.

A category of virus that I specifically look at that we are paying attention to is called Nipah virus. That is a virus carried by large fruit bats across Asia, and this is a virus that spills over almost annually in Bangladesh and India causing localized outbreaks of encephalitis. It carries a very high case fatality rate of about 75 percent on average, and so far, it is only capable of limited human-to-human transmission.

But there is the potential that strands of this virus exist in nature that are more easily transmissible among people. So we are working very hard with local authorities and scientists to put in interventions that will limit the opportunity for that

to jump.

So that one is on the radar, but I would say a little differently than things like coronaviruses and influenza viruses, which have proven to be both transmissible and have the ability to cause global pandemics.

Senator Whitehouse. To both of you, which aspects of U.S. trade policy should be brought to bear on dealing with this issue?

Mr. Epstein. Should I begin?

Senator Whitehouse. Sure.

Mr. Epstein. Trade policy, so one of the issues that sparked that report I mentioned earlier from the GAO was really that we have a piecemeal approach to looking at importation of zoonotic disease through wildlife trade and live animal imports. The CDC has jurisdiction over known zoonotic agents and the animals that carry them.

So there is some regulatory authority there to regulate, say, the importation of bats for the virus that I just mentioned, Nipah, or rodents because of the Monkey Pox outbreak that was sparked by the importation of African rodents that led to infection of prairie dogs that were sold as pets, and then infection of people in the Midwest back in 2004. But it is very specific to already-established threats.

USDA regulates the importation of animals looking at

diseases that threaten livestock health, but doesn't look specifically at wildlife. So from a regulatory standpoint, we still have a big gap in looking across the board at live animal imports and the potential to carry zoonotic viruses. That is something that needs to be addressed.

I wanted to say one more thing before I hand over to my colleagues. CITES has been mentioned a few times as an effective framework for dealing with this issue, but there are a couple of shortfalls, and I agree with Mr. Ashe, that CITES would have to be amended. Number one, CITES doesn't address health issues in animals. Number two, it doesn't cover all the species that are known to be reservoirs for zoonotic viruses, some of which aren't protected or aren't endangered.

Three, it doesn't govern the intranational movement of animals, which can still present a risk for emergence in a market system. These are things that would need to be addressed to make sure that this kind of global convention or treaty would be effective at protecting health.

Senator Braun. Thank you. My time has expired.

Senator Barrasso. Thank you, Senator Whitehouse.

Senator Ernst?

Senator Ernst. Thank you, Mr. Chair, and I really do appreciate this topic today. This is very timely or untimely, as Senator Whitehouse just mentioned, but I am glad that we are

taking it up.

Illegal wildlife trafficking is a contributing factor to the spread of diseases like COVID-19. It is well known that China is ground zero for trafficked wildlife products. Making the matters worse, unregulated Chinese wet markets oftentimes serve as outlets for the purchase and sale of wildlife that can carry disease.

As we continue to battle COVID-19, we all need to make sure that we are doing what we can to ensure that this never happens again. That is why I have introduced a bipartisan bill that would ban U.S. taxpayer dollars from being spent at China's unregulated wet markets ever again. The Federal Government should not be subsidizing these dangerous, disease-prone markets.

For our panelists, many have called for China's unregulated wet markets, and for those that haven't followed this, the wet markets are where wild and domesticated animals are sold and slaughtered for human consumption, to be shut down. We would love to see those shut down, given their role in spreading deadly diseases or viruses that pass from animals to humans, like SARS back in 2003, and now apparently, the novel coronavirus.

The legislation that I introduced with Senator Merkley would ensure that U.S. taxpayer funds are not spent to purchase

dogs, cats, birds, or other live animals at these Chinese wet markets, as has been done with taxpayer funds in the past.

For the panel, would you agree that wet markets that sell and slaughter live animals are a danger to public health? If everybody could maybe answer that question and respond why you might see them as a threat to public health.

Catherine, we will start with you, please. Thank you.

Ms. Semcer. Thank you, Senator.

The markets you describe certainly present a risk. But as was stated in a letter that I signed to the World Health Organization and U.N. Environment Program, along with a number of other researchers, it is really important that we not overreach on this issue.

The experience has been after past outbreaks of Ebola, that when you seek to completely ban the consumption of wild game meat, those bans often fail because this is a cultural issue as much as it is a health issue. What happens is that the trade is then driven underground. We have seen this happen recently in China with their bans on wet markets. Once the trade is driven underground, you see an increased risk of disease, because the sanitary conditions these animals are kept in often become much worse than they were when the trade was out in the open.

Similarly, if there is a disease outbreak, it becomes much more difficult for researchers to trace the origin of that

outbreak, because you are all of a sudden in the criminal netherworld, and people are much less likely to talk with authorities than if the trade was out in the open. So while they do present a risk, it is important that we not overreach in our attempts to mitigate that risk.

Senator Ernst. Could you agree that U.S. taxpayer funds shouldn't be spent in those wet markets?

Ms. Semcer. Senator, I am not familiar with the past spending. I have to respectfully decline to comment.

Senator Ernst. Fair enough, thank you.

If you would, Dan, please go ahead, thank you.

Mr. Ashe. Thank you, Senator.

There is no doubt that wet markets, wherever they exist, present a risk. I think the important thing is for us to work internationally to define what constitutes high risk in terms of these markets, and then how do we go about working with the rest of the world to regulate and to reduce the risk associated with those markets.

So while ,I might agree with you on one level about not spending taxpayer money, some ways to reduce the risks may be to work with those countries on to provide appropriate refrigeration, or introduce sanitary methods into those markets, recognizing, as Catherine said, it is going to be pretty hard to eliminate a lot of these markets, because they are tied to

nutritional needs.

I was in Cusco, Peru last winter, and they have a classic, what you would call a wet market, in the middle of Cusco, Peru. They are integral to those communities and support for those communities' nutritional needs. So what I think we would need to look at is how can we target our assistance to reduce the risks associated with those markets.

Senator Ernst. I appreciate that, thank you.

And Dr. Epstein as well, please.

Mr. Epstein. Yes, really, I think well stated by Dan and Catherine.

Not much more to add on that, other than to say that what we really need to do to help mitigate risk from these markets, I think, is to one, understand what the high risk animals are that are coming into those markets, and work to improve conditions, eliminate high risk animals from the markets, first of all, improve conditions within the markets. And I think also work to reduce demand for wildlife species that are prone to entering these markets. That is going to take an effort of more sociological outreach and behavioral risk effort.

Just a personal anecdote from working in Liberia in West Africa during, or just after the Ebola outbreak, where there was a ban on the consumption of bats and other wildlife, and in Liberia, bushmeat is the primary source of protein, people were

phoning in to the Minister of Health asking when it was okay to eat bats again.

Just because something is outlawed or banned, it doesn't mean the high-risk behavior will stop. So I think it is important to really understand that risk. Thank you.

Senator Ernst. Very good, and I appreciate that. What we do want to see is the stop of those types of products coming, obviously, illegally into the United States, but the spending of taxpayer dollars in those wet markets as well.

So we do believe, a number of us, that we should not be spending Federal Government dollars in those unregulated market areas. Some of you have touched upon ways that we perhaps could improve conditions, work with those governments through various agencies, so that we don't see the spread, maybe, of those types of viruses to humans.

Again, just building upon what Senator Whitehouse was visiting about earlier, what are those prime agencies that we could utilize to make sure that we don't see Americans infected with those viruses stemming from those wet markets? Yes, go ahead. Thank you.

Mr. Ashe. As has been mentioned here several times, the Convention on International Trade and Endangered Species is the principal entity in agreement worldwide for the regulation of wildlife trade. As Jon mentioned earlier, it would have to be

amended to cover trade in animals that are injurious to human health as well as trade in animals that are injurious to animal health and ecosystem health, but it would provide one overarching agreement.

It would require support from the World Health Organization, from the International Organization for Animal Health, from the Food and Agriculture Organization. So again, it would require an international cooperative framework to bring the appropriate expertise together.

Senator Ernst. Okay, fantastic. I apologize, my time has expired.

Senator Barrasso. Thank you so very much.

Senator Booker?

Senator Booker. Thanks so much, Chairman.

I am grateful for this hearing, and of course to Ranking Member Carper.

Look, I believe the critical lessons we have to learn from the COVID-19 and this incredible pandemic is in order to prevent future pandemics, we need to fundamentally change the way that we interact with wildlife across the globe. Quite simply, there is just no such thing as healthy humans in the absence of healthy animals and a healthy planet. We have been profoundly destructive in a very short period of time.

We are seeing it with us now entering one of the greatest

periods of mass extinction we have had on the planet. The deforestation, the habitat destruction that is going on is not just bad for wildlife, it is our own future that we put at risk when we destroy on such a global scale these ecosystems.

The messages from scientists are very clear. In order to protect ourselves from future Coronavirus, we must do three things: stop destroying forests and ecosystems. Number two: shut down these live wildlife markets. Number three is put an end to wildlife trafficking. These are three globally urgent causes for the future of humanity. To not do this puts our species at serious risk.

In April, Senator Graham and I led a bipartisan letter to the World Health Organization calling for global shutdown of live wildlife markets and the international trade in wildlife. But let's be clear: this is not just some problem out there in other countries. I know we are in a period of pointing out the extraordinary problem we are seeing in China. But let's understand; this is a global problem, and every country has an important role to play to reduce the risk of future pandemics.

For example, in addition to doing more to eliminate wildlife trafficking in the United States, we must address factory farms, which present at least as much of a risk to starting a future pandemic as wildlife markets do. We know this because the yells, the consensus of concern, globally, about the

overuse of antibiotics, for example, is going to create a super drug that threatens us all.

Mr. Ashe, I am grateful for your testimony. You have already covered a lot of my questions, but I just want to go really quick, if you can, answer these questions in as short and concise a way as possible.

For the U.S. to show global leadership, can you explain more that the Fish and Wildlife Service, what they should be doing domestically and internationally to reduce the risk of future pandemics? What scale of additional resources do you estimate the agency would need in order to be effective?

Mr. Ashe. Well, domestically, I think they need to increase their enforcement of the Lacey Act. I think that they need to enforce the scale of their inspection efforts. So as wildlife productions are coming into the United States, increase the scale and their ability to conduct inspections and increase their ability to do law enforcement investigation, so that we are finding the routes of trade whereby animals are illegally coming into the United States and then reduce demand.

The United States continues to be one of the world's, if not the world's, largest consumer of wildlife products. So I think the United States Fish and Wildlife Service has to have a multifaceted response: inspection, law enforcement, demand reduction, conservation, and science to support all of these

efforts. I would say the scale of that, it is certainly is in excess of a billion dollars to build that kind of network of support and capacity.

Senator Booker. Right. And Mr. Ashe, I am irrevocably focused on China and their very bad actions. But what you just said there, about the role that the United States plays in global wildlife markets, we have serious work to do to step up to this. Live wildlife markets present this profound, unacceptable risk of zoonotic diseases that need to be shut down globally, including here, with the risks we see in the United States.

Can you just talk about the zoonotic disease risks that are present in the entire wildlife supply chain with a little bit more specificity? Again, cogent, because I want to get one more question in, if I can.

Mr. Ashe. Okay. So, with a little bit more specificity, I am unsure what you are looking for, except that the volume of traffic in animals, legal and illegal traffic in animals, is enormous. So the U.S. Fish and Wildlife Service, just in terms of law enforcement, and illegal trafficking and wildlife, the general consensus was on a good day, we are inspecting about 10 percent of the volume of traffic that is coming into the United States of animal traffic.

So I think that given the current level of our capacity and

investment, we have really no kind of reasonable hope of anticipating and then enforcing restrictions on the importations of dangerous, exotic pathogens.

Senator Booker. Right. And you hit on the note I really wanted to get out of that question, which was, in a Nation that I have watched in my short time in the Senate that has spent so much money increasing enforcement with homeland security, so much money increasing enforcement with customs and border control.

When it comes to the safety and well-being of Americans, as we have seen the egregious amount of deaths from a global pandemic, to think that we are only inspecting about 10 percent or enforcing about 10 percent of the legal wildlife trade, not to mention what we need to do on the legal, we are woefully inadequate in doing what we need to be doing to protect American lives.

The last thing I just want to ask you real quick is, Mr. Ashe, could you expand upon your testimony regarding the ways that deforestation and other ecosystem destruction puts us all at risk for future pandemics, and the massive clearing around our Country as well as, frankly, the rainforest, going on to support these large demands of animal agriculture? We are seeing deforestation at levels that are stunning. Why is that such a risk for future pandemics?

Mr. Ashe. Just briefly, as we think about the map that Mr. Epstein put up earlier, and when you think about these biological hot spots, the Amazon Rainforest, the Congo Basin, the Mekong River Basin, these are areas of tremendous biological diversity, including diversity in viral pathogens.

As we are disturbing and disrupting these ecosystems, we are presenting the opportunity for the exchange. We are putting stress on the animals that live there, increasing their susceptibility to disease, and we are introducing pathways for those diseases to be introduced to humans.

So we simply have to do a better job of conserving biological diversity globally, which means conserving the habitat for those animals. The U.S., again, is in a position of not only providing the international assistance to help drive that and build capacities in these countries, the U.S. is also in a position to show leadership by doing more to protect biological diversity here in the United States.

Senator Booker. Mr. Ashe, if I can stop you, you are not giving the scale. Are you familiar with the book *The Sixth Extinction*?

Mr. Ashe. Yes.

Senator Booker. Tell me what that book is documenting.

Senator Barrasso. Senator Booker, you are way over time. We still have three members of the Committee that are waiting to

ask questions, so if you could just kind of limit it at this point?

Senator Booker. That is my last question, is what is that book documenting and what is actually going on, the scale of it, and I will be done. Thank you, Mr. Chairman, for your leniency.

Senator Barrasso. Thank you.

Mr. Ashe. That book documents what is largely a scientific consensus among biologists and ecologists that we are living in the midst of the planet's sixth mass extinction event, and that the things that we are doing globally, humans, in terms of our energy development systems, our agricultural systems, are driving this sixth mass extinction.

Senator Booker. And that is a threat to humanity itself. Thank you very much, Mr. Chairman.

Senator Barrasso. Thank you.

Senator Van Hollen?

Senator Van Hollen. Thank you, Mr. Chairman, and thank you to all the witnesses here today.

To Mr. Ashe, it is good to have a fellow Marylander on the panel. Thank you for your service at the Fish and Wildlife Service.

I have some questions regarding your experience then as it applies to now. We have all heard about the important role the Fish and Wildlife Service can play in combating and regulating

international wildlife trade and preventing the spread of zoonotic diseases. One of the Fish and Wildlife overseas programs is the Central African Regional Program for the Environment, known as CARPE for short.

Back in September of 2019, in response to allegations of serious misconduct by local law enforcement and park rangers, the Department of Interior froze funding for the program, an action that I strongly supported. Because we need to make sure that our funds are targeted to the right people and the right organizations to do the job.

I am concerned, however, that the department has not developed an alternative use for those funds aiming at the earlier objectives with respect to international conservation. And I do believe that the fact that that program is lapsing does raise a risk with respect to the issues that we are talking about today.

Can you speak to that particular program, as well as other international programs? But start with that one.

Mr. Ashe. The Central Africa Regional Program for the Environment has been an enormously successful effort, and funds many things, including law enforcement, anti-poaching patrols, and efforts like that. As you said, Senator, we need to increase our diligence to ensure that those kinds of activities are done in a way that is respectful of human rights and

community prerogatives. So as you said, I would agree on that.

But the larger part of the CARPE Program and U.S. international assistance in general has been aimed at developing capacity within these countries, capacity to analyze the environmental effects of economic development, to protect, to set aside protected areas in countries like Gabon, which has been a world leader in marine protected reserves.

So if the department has concerns about the CARPE Program, then it should put in place the mechanisms to ensure those grants are reviewed to minimize the likelihood there will be human rights violations. To my knowledge, they haven't done that, and they are putting at risk close to \$40 million of assistance that could be going to these countries to support the kinds of things that we have been talking about at this hearing.

Senator Van Hollen. Well, I appreciate that, and I have raised this issue directly with Secretary Bernhardt. We have not gotten a satisfactory response as to what their alternative plans are with respect to those funds. I hope to work with the Chairman and Ranking Member on this Committee to get that sorted out.

In the remaining time, can you talk to the intersection of climate change and the spread of zoonotic diseases? Clearly, a lot of the changes we are seeing in our climate impact animal migrations as well as other animal behavior, and bring them in

closer contact with humans. We are talking about wildlife here. Can you talk about the intersection of those two issues?

Mr. Ashe. Sure. I think climate change, as Senator Booker asked previously about the sixth mass extinction, I think climate change is a kind of an overlying or underlying cause of disruption and stress in ecological systems and stress in animals. That increases the likelihood of incidence of disease and the likelihood of transmissions of disease between animals, between populations of animals, and between animals and humans.

As with many other things, climate change and the global disruption, ecosystem disruption that we are seeing as a result of rising climate, is going to increase the incidence, the risk, the frequency of disease transmission. So as part of our efforts to save ourselves and hopefully save ourselves from a future pandemic, we need to turn our attention increasingly to climate change and solving that.

Senator Van Hollen. Thank you. Mr. Chairman, thank you for holding this hearing, and that is the end of my questions.

Senator Barrasso. Thank you, Senator Van Hollen.

Senator Cardin?

Senator Cardin. Thank you, Mr. Chairman, and let me thank all of our witnesses. This has been a particularly important hearing.

We all know that we have a challenge. We have a challenge

because of wildlife trafficking, we have a challenge, as Senator Van Hollen points out, because of climate change, we have a problem because of conflict between human life and animal life has become more challenging over time.

COVID-19 has gotten the international attention that we are all in this together and that we need to be more aggressive in dealing with this issue. We now have the global attention.

Each one of you have pointed out that U.S. leadership is indispensable in helping to deal with this challenge, and yes, we can learn from best practices of other countries; we can look at what has worked in this Country, and we can refine those tools. We have talked about that during this hearing.

But I am wondering whether we should have a bolder approach. Since we are in this pandemic, and we have the attention of the global community, should we be looking at a new treaty? Should we be looking at some form of enforceable international commitments to deal with wildlife trafficking and the spread of animal-borne diseases that affect us, our human life? Is this the time that we should be looking to initiate a global response to control these activities?

If any one of the three of you want to respond, that is fine with me.

Mr. Ashe. Thank you, Senator Carper. I will just reiterate as I have said previously that I do believe we need a

new amended Convention on International Trade in Endangered Species, and so it could be a Convention on International Trade in Endangered and Injurious Species.

The thing about CITES is that it is enforceable among the parties. You have an enforceable, international agreement.

So I think that presents the greatest potential for us to address this issue, do it as promptly as possible, and build an international organization that has competence and capacity in the trade of wildlife.

Senator Cardin. Thank you.

Mr. Epstein. I would add, in support of what Dan was saying that CITES would be a good basis for developing additional scope. But I think in addition to a legal framework, we need to redouble our commitment to strengthening systems outside of the United States, and particularly in parts of the world and countries that are vulnerable to disease emergence, where wildlife trade and trafficking occurs as one of the risk factors, and we need to really make sure that there are systems in place that can rapidly detect and respond to the emergence of a novel pathogen that likely comes from wildlife. That is going to ultimately allow us to contain outbreaks before they become global pandemics like COVID-19.

That is something that is really incumbent upon us, is having resources to help countries strengthen those systems. It

is going to protect us. The cost, the investment required to do something like that, is a tiny, tiny fraction of what the damages have been already from COVID-19 and will continue to be. So these are investments we should be thinking to make beyond just policy.

Senator Cardin. Mr. Epstein, can you identify a country other than the United States that you think has been the strongest and has the best model for us to take a look at in that regard?

Mr. Epstein. Sure. There are a number of countries that have now been establishing One Health frameworks at a policy level, that is formal, codified relationships between ministries of health, ministries of livestock, of agriculture, and ministries of environment that include wildlife agencies. One example that is been particularly progressive is actually Bangladesh, which is a relatively small country, but it has responded to zoonotic disease outbreaks like Nipah virus and Avian influenza and Anthrax by really rallying around those and recognizing the need for coordinated surveillance and response.

That is one example. There are other countries, too, that are building such frameworks in Southeast Asia and in Africa, starting to really bring together those three sectors of human health, domestic animal, and wildlife. I think that is a model we need to encourage and continue to support.

Senator Cardin. Thank you.

Mr. Chairman, I look forward to working with you and other members of the Committee. This is an area where I think we can make some strong progress. Thank you for having this hearing.

Senator Barrasso. Thank you very much, Senator Cardin.

As I turn to our Ranking Member, I just point out to our three witnesses, we have had over 13 members of the Committee participating by video and asking questions. Dan, you have been at a number of these committee hearings, that is a pretty impressive turnout of this Committee, which shows how much interest there is in this topic.

Senator Carper?

Senator Carper. All the more remarkable, we only have 12 members.

[Laughter.]

Senator Carper. I don't know where these extra people are coming from. We can sell tickets for this one.

I want to apologize again to Catherine Semcer, to Jonathan Epstein, and to Dan Ashe for my being absent for much of the last hour. I serve as the senior Democrat on the Environment and Public Works Committee, but also the committee called Homeland Security and Government Affairs. We were marking up, I don't know, a couple dozen bills and nominations, so I am wearing two hats at once. I am not doing it all too well, but

hopefully, things seem to have proceeded very nicely here in my absence. Not surprisingly.

A number of the questions that I was prepared to ask have been asked. I will try not to ask them again, but one, again, thank you for not just for being here, but for answering the questions and for your testimony, but also for what you do with your lives. We are grateful to you for that and have been for some time.

The first question I want to ask deals with the impact of COVID-19 on the AZA members. I was told by Elizabeth Mabry, who may be sitting behind me, about AZA. I thought that used to be a sorority at Ohio State, but as it turns out, it is also the Association of Zoos and Aquariums, so that is a twofer, I guess, Dan.

Here is the question, though. While this question is on the periphery of the issues that our committee is considering today, I don't want to pass up the opportunity to ask it. We know that the current coronavirus pandemic has seriously impacted zoos and aquariums. These facilities have unique needs. We are proud to have an AZA-accredited zoo in Delaware, which contributes to wildlife conservation efforts and is an educational beacon in our State, and one that we hope to improve even more in the next year or two.

My question would be this: would you elaborate, Dan, on the

impacts of the current pandemic on zoos and aquariums? How could these impacts harm conservation efforts, particularly for endangered and imperiled species? Thank you, go ahead.

Mr. Ashe. Thank you, Senator Carper. AZA is an accrediting body. In order to be a member, you must be accredited. We have 240 accredited members, mostly here in the U.S., but in 13 countries across the globe. The pandemic has been devastating for them, because they are businesses more than anything else, they are businesses. They rely on earned revenue to do the work that they do, and that earned revenue comes from something that we call a guest or visitor.

In a typical year, our members would welcome more than 200 million visitors, or guests, which is more than all professional sports combined here in the United States. So they are under severe financial distress right now.

The effect of that on conservation is that our members collectively, also in 2019, our members spent \$232 million in direct support for field conservation. So coming into 2020, I suspect that contribution to conservation is going to decline precipitously, because our members are missing the key ingredient in supporting that conservation, which is gate revenue, visitor-based revenue. They are under severe stress.

These are organizations which play a key role in supporting the Federal Government's effort in saving animals from

extinction, whether it is the Wyoming toad or the black-footed ferret, or the California condor, or the West Indian manatee in Florida, or sea turtles. Whether it is mountain gorilla in Uganda and Rwanda, our members are doing conservation all over the world, and they are supporting efforts at sustainable and healthy interactions between humans and wildlife.

So without that key economic ingredient, which is earned revenue, the ability of our members to support that is going to be dramatically reduced.

Senator Carper. All right, thank you. I think the issue of stress has been raised by a couple of my colleagues already, but I want to return to it just for a moment. Stress appears to be a key factor in an animal's susceptibility to disease, and therefore its likelihood of transmitting disease to other species, including us, human beings.

Question: would you elaborate on the role of, this is for Dr. Epstein, would you elaborate on the role of stress in animal disease transmission? What factors contribute to the stress experienced by traded animals? What might we be able to do as a Nation to reduce levels of stress with respect to our live animal import practices? Dr. Epstein, please.

Mr. Epstein. Thank you, Senator Carper. That is a great question.

Generally, speaking, stress, just like in people, causes

immune suppression. When an animal or person is under stress, their immune system doesn't function as well. If they are already infected with, say, a virus, their ability to clear that virus from their system is impaired.

What that can translate into is increased or prolonged shedding or transmission of that virus. So an animal under stress that is the host for a zoonotic virus may shed that virus for a longer period of time or at greater quantities, because it simply isn't able to get rid of it. That is directly one way that stress can influence risk of zoonotic disease transmission.

Wildlife trafficking is a particularly stressful activity for the animals involved. They are often contained in tiny little cages. Many times multiple animals are packed together. If one of them is shedding, they all get exposed.

Importantly, a lot of times in the trafficking route, the value chain to markets, multiple species are interacting with each other, and so animals that in nature would never normally interact have the opportunity to exchange pathogens like viruses. This can lead to viral mutation; it can lead to adaptation.

Then when people are thrown into the mix, like in trafficking activities, they can then be exposed to animal pathogens that have the ability to infect people.

So stress plays a big role. It is not being well studied

directly, in other words, it is hard to say how much stress or what the cutoff is. But generally speaking, the conditions that animals are kept in as part of the illegal wildlife trade and sometimes legal wildlife trade contribute to the stress of those animals in transport.

Senator Carper. I think you said that when I asked my question, you said that was an important question. You gave a very good answer; that was illuminating.

I have one last question Mr. Chairman, if I could. I would just like to briefly ask our witnesses about citizen engagement. Do we have time? Thank you.

I would say to each of our witnesses, and I would like to start with Catherine Semcer on this. You have spent a fair amount of time talking about the role of governments in preventing future zoonotic disease outbreaks and pandemics.

My question would be this: what can U.S. citizens, do to help? What can U.S. citizens, do to help? Are there steps the U.S. Government in partnership with other governments is already taking or can take to educate our public on threats of wildlife trafficking to conservation and human health and safety? How can we help? Catherine?

Ms. Semcer. Well, thank you for that question, Senator. We spent a great deal of time discussing how to better oversee wildlife trade and how to interdict wildlife that is being

trafficked.

But I always go back to the U.S. national security strategy and its goal of containing biothreats at their source. In this context, that means maintaining healthy, functioning ecosystems.

In my written testimony, I have supplied a map that shows the overlap between the world's remaining large unroaded areas and likely points of zoonotic disease outbreak. I have also discussed extensively the role of Chinese investment in facilitating the deforestation of areas like the Congo Basin, where the risk of zoonotic disease spillover is very likely.

I have also discussed the role that the U.S. consumer market plays in this deforestation. While a lot of the raw logs are going to China, that wood is then turned into products which are ultimately shipped to the United States.

American citizens decreasing their demand for tropical hardwoods is absolutely essential to guaranteeing our biosecurity and our health security going forward. Limiting our consumption of tropical hardwoods from places like Africa is even more critical. So anything we can do to change that pattern of consumption to facilitate forest conservation in places like the Congo Basin, is going to be a step in the right direction.

Senator Carper. Thank you, ma'am.

Dr. Epstein, please?

Mr. Epstein. In the United States, one of the main drivers of animal importation is the pet industry. I think it is really important that people do have a relationship with animals by having pets, and stay connected to them.

But consumer education and making sure that our consumers are aware of the importance of domestically bred exotic species as opposed to those that are pulled from the wild through less diligent agencies that are selling animals would be an important step to eliminating risk. Also, helping American consumers be aware of the potential risk for zoonotic pathogens coming in with certain animal species. So making sure that educations and outreach is part of helping to control consumer demand for exotic animals.

Senator Carper. Thank you for that response. We have one last question. Same question for Dan Ashe, please.

Mr. Ashe. Senator Carper, I will come back to the Association of Zoos and Aquariums and our 200 million visitors. I think there is a great opportunity to educate the public and increase the awareness amongst the public about what is happening globally, about the kind of ecosystem degradation that is happening globally, and what the United States of America can do to help stop that.

Joining in campaigns like the Campaign for Nature, as I said, to save 30 percent of nature for biodiversity by 2030, is

a great opportunity to explain to the public the importance and the need for biodiversity conservation and the related importance to human health.

I think education about responsible behavior, the Association of Zoos and Aquariums is the home of the Wildlife Trafficking Alliance, which is an alliance of more than 80 organizations including corporate organizations, as well as zoos and aquariums. One of their major endeavors is to increase awareness amongst the public about wildlife trafficking and what individuals can do to help stem the epidemic in wildlife trafficking.

All of these efforts require engagement and leadership from the United States Government and support for efforts at education and awareness building and demand reduction and compliance, so that normal citizens can help us with compliance. So I think we are in great need of additional Federal investment and resources to support all of these efforts.

Senator Carper. All right, thanks.

Thank you all. It was great to see you, and thank you again for your good work and for joining us today, both in person and from afar. Thank you. Mr. Chairman, thanks.

Senator Barrasso. Well, thank you.

If there are no more questions from members today, they may, as you know, submit questions for the record, so the

hearing record will remain open for two weeks.

I want to thank the three of you for being here, Ms. Semcer, Dr. Epstein, Mr. Ashe. Terrific testimony, great insight. Obviously you generated a lot of interest from members of the Committee and we are grateful for your time and your testimony.

Senator Carper. Mr. Chairman, I have one UC request, if I could, before we adjourn, please. Thank you.

Senator Barrasso. Please.

Senator Carper. I ask unanimous consent to enter into the record supplemental materials from stakeholders with interest in zoonotic disease and wildlife trade. Thanks.

Senator Barrasso. Without objection.

[The referenced information follows:]

Senator Barrasso. Senator Whitehouse?

Senator Whitehouse. Mr. Chairman, I just wanted to put in a good word for the International Conservation Caucus while we are having this conversation. That group has been working very hard to make sure that on a bipartisan basis, members of Congress, members of the Senate, have the opportunity to understand these issues very well. Their support for the International Conservation Caucus Foundation has helped move us forward in oceans area and other areas. I just wanted to add that plaudit before we drop the hammer.

Senator Barrasso. Thank you very much for your leadership on that, Senator Whitehouse.

Thank you all for being here and for your participation and your testimony and your time. The hearing is adjourned.

[Whereupon, at 11:42 a.m., the hearing was adjourned.]