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EXAMINING INNOVATIVE SOLUTIONS TO CONTROL INVASIVE SPECIES AND
PROMOTE WILDLIFE CONSERVATION

Wednesday, March 15, 2017

United States Senate

Committee on Environment and Public Works

Washington, D.C.

The committee met, pursuant to notice, at 10:15 a.m. in room 406, Dirksen Senate Office Building, the Honorable John Barrasso [chairman of the committee] presiding.

Present: Senators Barrasso, Carper, Inhofe, Capito, Boozman, Wicker, Fischer, Sessions, Moran, Rounds, Ernst, Sullivan, Cardin, Sanders, Whitehouse, Merkley, Gillibrand, Booker, Markey, Duckworth, and Harris.

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

Senator Barrasso. Good morning. I call this hearing to order.

Today's hearing will explore innovative solutions to control invasive species and promote wildlife conservation.

Not long ago, Google and Uber were nouns and verbs yet to be discovered, and Amazon was a rain forest in South America. Today we Google to search online, we Uber to move around a city, and we shop online at Amazon. Innovation changes everything.

Since the turn of the twenty-first century, companies like these have rapidly changed our world and transformed every sector of our economy. The wildlife conservation sector is no exception. Federal and State wildlife agencies, wildlife conservation groups, private technology companies, scientists and researchers, farmers and ranchers, hunters and anglers, all are working together to create cutting-edge solutions to our most pressing wildlife conservation challenges.

In Wyoming, we have a profound respect for our wildlife. We applaud the efforts of innovators to help us better conserve and manage our wildlife at lower cost. Wyoming is one of the most beautiful States in the Nation. People travel from around the world to come to Wyoming because our State's natural resources and wildlife are spectacular.

Wyoming doesn't take our exquisite natural resources for granted. When I was in the State Senate in 2005, we established the Wyoming Wildlife and Natural Resource Trust that Governor Freudenthal, who was here testifying just a few weeks ago, signed into law.

Our State wildlife managers grapple with many challenges that innovators can help us solve. For example, poaching is a problem in Wyoming. Hundreds of animals are taken illegally each year in the State, according to our Wyoming Game and Fish Department.

Poaching is a problem in other States too, and it is pandemic overseas. The African elephant population has been reduced by almost 75 percent over the last 10 years, as poachers seek to cash in on the ivory trade. Just this month it was announced that one of Africa's last great tusker elephants, around 50 years old, with each tusk weighing around 112 pounds, was shot and killed by poachers. Over 1,300 African rhinos were poached in 2015 to satisfy demand for rhino horns in countries like China and Vietnam.

Invasive species also present a threat to native wildlife, water resources, and our landscape. Cheatgrass is an invasive species that infests hundreds of millions of acres. Cheatgrass threatens soil retention, burdens already taxed water supplies, provides low quality foliage for wildlife and livestock, and

fuels catastrophic wildfires.

Wyoming also faces challenges from other invasive species. The list goes on and on.

Invasive species are a problem for the Country. In Florida, there is the Burmese python, which can grow to more than 23 feet and weigh up to 200 pounds. A few years ago, Senator Nelson brought the skin of a Burmese python to a Committee hearing. It was a striking demonstration. I don't know if you were here that day, but they had the table and then they had to have extensions on the table for the Burmese python to lay out so they could display it. And they grow up to 23 feet. That one that he had that day was less than 23 feet. It was still --

Senator Carper. Was it alive?

Senator Barrasso. It was not, no.

[Laughter.]

Senator Barrasso. We can bring the live one next time.

[Laughter.]

Senator Carper. A smaller one, maybe.

Senator Barrasso. The U.S. Geological Survey says this invasive species has devastated up to 99 percent of the area's native deer, racoon, bobcat, and possum populations.

In the Chesapeake Bay area, there is the Northern snakehead, which preys on native fish populations. The Midwest

has the emerald ash borer, which continues to kill millions of ash trees across 29 States.

Our Nation's innovators are developing cutting-edge technologies to help us effectively fight poaching, better manage wildlife, and control invasive species. A 2015 National Geographic article outlined a number of innovative technologies being used to promote conservation of many of the world's most endangered species, including a crowd funding to pay for drones to locate poachers, DNA analysis to identify the origin of illicit ivory supplies, deploying thermal imaging placed along perimeters of protected areas to notify authorities of the entry of poachers, and using mobile apps to assist wildlife law enforcement in carrying out their duties.

In December, the National Invasive Species Council cohosted the Summit on Overcoming the Invasive Species Challenge. It publicized innovations to fight invasive species, including a fish passage that automatically extracts invasive fish from streams, genetic tools to curb the spread of invasive organisms, DNA technologies to provide early detection of invasive species, drones to gain spatially accurate high resolution imagery for the detection and monitoring of specific invasive species.

So I look forward to hearing many innovative ideas conserving wildlife and controlling invasive species from the distinguished panel that we have today. I hope the hearing

helps to set the stage for developing bipartisan legislation that will promote new innovative solutions to better battle and manage invasive species, to conserve wildlife, and to limit illegal poaching of rare and valuable species.

I now ask our Ranking Member, Senator Carper, for his comments.

[The prepared statement of Senator Barrasso follows:]

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

Senator Carper. Thanks, Mr. Chairman. Thanks for bringing us together. And thanks to all of our witnesses for joining us, as well, and for some of you travelling quite a distance. One of you, I think, wears another hat in the Wyoming National Guard. I am an old Navy guy and I said earlier, Navy solutes Army. So thank you, especially for that service, colonel.

I would ask to be submitted for the record a publication article from the National Geographic that was dated, I think, December 31st last year, and it is an article by Jani Actman about some good news, and the good news is something that was followed on about a year after President Xi and former President Barack Obama had come to an agreement about a year ago that China would shut down its ivory operations, export and import of ivory. And that is, I think, going to become effective at the end of this year.

I was part of an Aspen Institute seminar in Tanzania about two years ago. We had about 20 of our colleagues from all over. Were you there, Roger? There were about 20 of us there. And this was one of the issues that was foremost in our conversations, and I think some good work took place at the very top with the leadership of our two countries, and we are going to see the benefits of that later this year.

But as was apparent from witness testimony during our recent hearing on the Endangered Species Act, the plants and the animals that share this planet with us are having a rough go of it in each of our States and around the world. This is an all-hands-on-deck moment in human history, and while the United States' Endangered Species Act may be a gold standard for species protection and recovery, it is what it has always been, and that is a safety net.

Thanks to a terrific panel of witnesses here today, this hearing gives us a chance to focus on a couple of special challenges that our fish, wildlife, and plants face, as well as to celebrate our creativity in meeting those challenges and to buck up our efforts to find new and better ways to give them a chance to survive.

I very much appreciate, Mr. Chairman, your commitment to stimulate that much-needed creativity.

We will hear today some very worrisome stories about invading sea lamprey and ruthless poachers that will illustrate why it is so important that we are up to this challenge.

These are not minor irritations. These are not inconsequential threats. Wildlife trafficking is a multi-billion dollar enterprise globally, and invasive species cause more than a trillion dollars of harm every year. We have an unassailable obligation to muster the will, the intellect, and

the resources to help our challenged fisheries, threatened ecosystems, as well as our treasured bears, our rhinos, and elephants survive in a world that is tough enough.

I want to thank again each of our witnesses for helping us to better understand the fix that our fellow species are in, and for pointing us in a more enlightened direction. I especially want to express my appreciation of the work that each of our witnesses does through their organizations and their teams to fight back. As I said earlier, this is an all-hands-on-deck situation. Your colleagues are all in, and we are grateful for that.

Again, thanks, Mr. Chairman.

Looking forward to hearing your testimony and our conversation.

[The prepared statement of Senator Carper follows:]

Senator Barrasso. Well, thank you, Senator Carper.

I want to remind the witnesses that your full written testimony will be made part of the official hearing record, so I ask that you please try to keep your comments to five minutes.

I am going to start by introducing Mr. Brian Nesvik, who has been serving since May of 2011 as the Chief Game Warden at the Wyoming Game and Fish Department. He is also a colonel in the Wyoming National Guard. We had an opportunity to be together Thanksgiving 2009 in Kuwait. He was deployed as the commander of the 300th Field Artillery Unit, the Cowboy Cannoneers, running convoy operations into Iraq. He also served as the Regional Wildlife Supervisor at the Wyoming Game and Fish Department in 2010-2011. Before that he was a game warden for over 15 years in Western Wyoming. In 2010 he was the Wyoming Game Warden Association's President. He is also honored by the Safari Club International as Wildlife Officer of the Year.

In many of these positions he has accumulated a wealth of experience in wildlife management, so I hope he will tell us about, based on his extensive experience, things that he has learned in balancing the interests of Wyoming, the citizens, and the abundant wildlife to effectively and efficiently address the challenges posed to the State by wildlife management.

It is a distinct honor to welcome you. I know you have two of your children here today. Thank you so much for joining us

at the Environment and Public Works Committee. Thank you for making it through the snow and to Washington yesterday, something, by Wyoming standards, is next to nothing, but it was enough to paralyze the city here.

[Laughter.]

Senator Barrasso. So, welcome and please proceed.

STATEMENT OF BRIAN NESVIK, CHIEF GAME WARDEN, WYOMING GAME AND
FISH DEPARTMENT, CHEYENNE, WYOMING

Mr. Nesvik. Thank you, Mr. Chairman and Ranking Member Carper. Thank you for your gracious and welcoming introduction. I am hopeful that I can meet your expectations and play my part on this distinguished panel that we have here today to talk about something that in Wyoming is oftentimes front page news. In Wyoming, wildlife is a very important value that many of our folks invest a significant amount of time and energies into.

As you indicated, Mr. Chairman, Wyoming is home to a very rich and diverse wildlife resource, and it is valued by an equally rich and diverse constituency. Much of the State's wildlife habitats remain in the same state they were in the 1800s and continue to provide wide open spaces and remote wild country for western iconic species like the sage grouse, grizzly bear, moose, pronghorn antelope, and elk.

The management, abundance, and quality of these resources are deeply intertwined and work symbiotically with multiple components of the State's economy, including agriculture, tourism, and mineral extraction. But more importantly, these resources directly influence the quality of life of Wyoming citizens and visitors from around the globe. Consequently, I have come to learn that our Nation's citizens deeply believe wildlife in the places they live are worthy of protection from

all threats, including invasive species of plants and animals, and the illegal exploitation of wildlife, more commonly referred to as poaching.

I am hopeful Committee members will come to better understand the tremendous potential that exists to improve techniques and tools to more efficiently fulfill our responsibilities to protect, conserve, and manage wildlife under the public trust doctrine and within the tenets of the North American Model of Wildlife Conservation.

Today I will offer my perspective from the view of a State wildlife manager who works very closely with private landowners, State and Federal land managers to achieve our mission. And while I will reflect on my experiences from the State of Wyoming, I will also offer you some thoughts based on my experiences and knowledge with other State wildlife management agencies. I am very fortunate to have the opportunity to be deeply involved with the National Association of Conservation Law Enforcement Chiefs, also known as NACLEC, which affords me a much broader perspective. This network allowed me to reach out very quickly, within 24 hours, and receive feedback from across the entire Country, from many of the States represented by Senators here on the Committee, and this is feedback that informs my testimony here today.

There are three particular areas of wildlife law

enforcement and management innovations where I believe the future opportunities exceed those that have occurred in the past.

Firstly, I think you will hear more about this on the panel today because this is such an important capability, and that is the use of unmanned aerial vehicles, or UAVs. They have tremendous potential as tools to protect and manage wildlife in a much more efficient and effective manner. UAVs are capable of carrying onboard cameras, forward-looking infrared, or FLIR, night vision viewers, and other remote sensors. A key benefit to the use of these platforms is the ability to fly them with significantly less power and without placing people onboard.

UAVs, with greater innovation and improvements in their technology, could provide conservation law enforcement officers a much better capability to conduct flights that would otherwise be possible in manned aircraft, but without having to place people in harm's way. With improved capabilities, UAVs could allow conservation officers across the Country to patrol critical winter ranges, waterways where wildlife and valuable wildlife exists more efficiently than could otherwise be done with a motor vehicle, an all-terrain vehicle, motorboats, horseback, or on foot.

Likewise, UAV use has tremendous potential for many of the same reasons in collecting key information on wildlife

populations. Some of those uses include aerial classifications of wildlife, monitoring, tracking their movements and migrations, as well as habitat mapping, all of these things that are currently done with the use of manned aircraft at a significantly higher expense.

Secondly, wildlife forensics. Advancements in wildlife forensics and the analysis of evidence in wildlife cases likely has the broadest potential for impacts with global reach. In a day when the horns from a bighorn sheep poached in the northern Rocky Mountains may find its way to markets in other countries, the value provided by capabilities in wildlife forensics cannot be understated.

Through both chemical and genetic analysis, forensic labs around the Country are able to provide real results that identify the species and source of a particular piece of evidence. Genetics analysis is coming very close to being able to match a particular piece of evidence, like a hair or a horn, to a geographic area of origin.

And, lastly, looking forward at the FLIR technology that I mentioned earlier, at thermal imaging, they also provide significant potential for new ways to collect information on wildlife populations. You can reference photos and maps, images, in my written testimony and gain some understanding of these tremendous potentials that exist to sample wildlife.

There are other things that I think are important but may not rise quite to the same priority. Those things, such as GPS tracking devices, still cameras to monitor wildlife movements in remote areas, and computer forensics to analyze suspect personal computers in wildlife cases are all important, but this FLIR technology I believe probably has a greater priority.

In conclusion, Mr. Chairman and Ranking Member Carper, there is a need for innovation and development of new techniques in wildlife conservation and protection. While there have been landmark-type enhancements over the past couple of decades that are in use now, there are more opportunities for future development. New technology improves efficiency, reduces costs to the taxpayer, improves the safety of wildlife managers, and provides for more effective conservation.

Opportunities are most likely to evolve and mature with partnerships between private industries, private landowners, governmental entities with a reasonable and practical investment of financial resources in all stages of their development. This has been the model that has been used successfully heretofore, and I believe that it has demonstrated some successes.

Again, I appreciate this opportunity to share my thoughts, and I really look forward to listening to the testimony from other members of this panel and also the dialogue with all of you. Thank you.

[The prepared statement of Mr. Nesvik follows:]

Senator Barrasso. Thank you so much for your very thoughtful testimony. Appreciate you being here today.

We will next turn to Mr. Carter Roberts, who is President and CEO of the World Wildlife Fund.

Thank you, Mr. Roberts, for being here today.

STATEMENT OF CARTER ROBERTS, PRESIDENT AND CEO, WORLD WILDLIFE
FUND

Mr. Roberts. Thank you, Chairman Barrasso and Ranking Member Carper, members of the Committee. Thank you for the opportunity to be here today.

WWF is the world's largest conservation organization. We operate in 100 countries; we have 5 million members worldwide; and we work with the private sector, governments, civil society, and communities around the world.

When you read in the newspaper, as we did last week, that a couple of individuals broke into a zoo outside of Paris, found a white rhino, killed it and sawed off its horn, you know that we do not live in ordinary times.

Chairman Barrasso already stole my thunder on the scale of the poaching epidemic that sweeps the world, but it ranks right up there among the biggest illegal trade activities out there. And the other shoe dropped when the intelligence communities did a research study of the connection between wildlife crime and the illegal trade in arms and human trafficking and drugs, and at this point the trade in wildlife is bound up in all of those other criminal activities. It is conducted by big criminal syndicates, and it is sophisticated and it is growing around the world.

The U.S. has played a leadership role in two areas:

conservation and technology. And I am delighted to talk about how the U.S. is leading in those areas around the world.

Rangers around the world face two great challenges. One is they can't see at night, when the poachers are most active.

Mr. Chairman, you are now holding a miniature version of a FLIR camera that enables you to see the thermal image of anybody in the room. There is a larger version of that camera that we have installed in places like the Maasai Mara and in the Kenya Rhino Reserve where you can see poachers a mile away in the dead of night. In parts of the world where local practitioners are turning down technologies as tricks and toys, they love this technology because it has enabled them to amp up their efforts to catch poachers at a time when they have usually evaded detection; and we are now installing these cameras on jeeps, on the top of towers, and places in Africa, and it is making a huge difference.

The other application of FLIR is being mounted on UAVs, and the New York Times yesterday had some great coverage of our recent partnership with Google, a \$5 million partnership to use unmanned aerial vehicles with FLIR technology to track poachers, particularly around the rhino poaching crisis in Southern Africa.

At some point, I would encourage all of you to watch the video coverage of that, and we can come back and do a show and

tell. Both of that coverage and the coverage using the FLIR camera to capture poachers in the wild, but it is dramatic and it is real and is making a difference.

There is another way that technology is important in our work, and that is through the illegal trade in animals through Internet trade platforms. And with traffic we are now working with eight global tech companies -- eBay, Etsy, Microsoft, Gumtree, Pinterest, Yahoo!, and Twitter -- in adopting a framework to prevent the illegal trade in wildlife through their sites.

We are using and testing ongoing technologies, and there are a couple of constraints. One is the ability for civil society to fund and scale-up these technologies. That unit costs \$2,500 just for -- don't drop it -- just that unit. The larger ones cost about \$15,000. We need the tech community, the private sector to step in and help us scale-up.

And then we also need the U.S. Government to continue to fund the investment in conservation through the ongoing support and funding for wildlife trafficking, including the END Wildlife Trafficking Act and the National Strategy on Combatting Wildlife Tracking, and the ongoing support for biodiversity conservation around the world through agencies through USAID and the Fish and Wildlife Service.

There are other ways the U.S. can help through

unconventional partnerships with the Department of Defense in repurposing technologies that have dual use so they can aid in efforts to stop poachers and wildlife traffickers, and to spur innovation through challenges like the USAID wildlife technology challenge, of which we were a part.

What we found with challenges is they work beautifully if you have a challenge to identify the technology, but you have also thought about the back-end, providing the accompaniment and the support to implement that technology in the field on an ongoing basis.

Meeting our goals will require the sustained support and training for rangers, resource managers and communities, individuals like my colleague from Wyoming and his counterparts around the world. We have seen how powerful these solutions can be. We know the United States is well placed as a leader in both innovation and conservation. We are heartened by the Committee's interest in this subject, and I hope you will continue to find ways to lend your support.

Thank you again for the opportunity to be here today.

[The prepared statement of Mr. Roberts follows:]

Senator Barrasso. Well, thank you very much for your testimony, Mr. Roberts.

We will now turn to Kim Kurth, who is the Acting Director of the Fish and Wildlife Service.

Thanks for joining us.

STATEMENT OF JIM KURTH, ACTING DIRECTOR, FISH AND WILDLIFE
SERVICE

Mr. Kurth. Thank you, Chairman Barrasso, Ranking Member Carper, and members of the Committee for the opportunity to testify on innovations and partnership that support wildlife conservation.

The Fish and Wildlife Service works with our partners to ensure current and future generations are able to enjoy the diversity of wildlife of America. Their enjoyment can take many forms, whether it is through hunting and fishing, wildlife observation, or even just the knowledge that wildlife exists.

Conserving wildlife is a complex endeavor. To address challenges ahead, the Fish and Wildlife Service must work effectively with our partners, both public and private, across both large and small landscapes.

We have seen great successes, but we realize there is still work to do in the future. My written testimony touches on a number of the ways we are working to transform the way we deliver conservation to benefit fish and wildlife species, and the people and communities who inhabit the landscapes with them. I will share just a few examples with you here.

Successful long-term conservation depends on a collaborative effort that focuses on both public and private lands. The primary tool for collaboration with private

landowners that the Service uses is our Partners for Fish and Wildlife program. Many private landowners are eager to work with the Service to help them to be the best possible stewards of their land they can. The Partners program has worked with more than 50,000 willing landowners since 1987 to provide financial and technical assistance to improve habitat and productivities on millions of acres of private lands, benefitting hundreds of species of native fish and wildlife, and we look forward to the opportunities that lie ahead.

Invasive species present a major threat to native fish and wildlife species, as well as to the economy. The Service has worked to develop innovative partnerships, management techniques, and technological advances to control the spread of invasive species, attempt to eradicate them, and to prevent their introduction into sensitive areas.

Invasive species are a constant threat, so the Service has worked to streamline its injurious species listing process under the Lacey Act and develop decision-support tools to help us prevent further introduction of invasive species. This includes a peer-reviewed model to help us as quickly predict the species most at risk of becoming invasive here in the United States.

We are also using molecular-based surveillance technologies, such as environmental DNA, or eDNA, to detect invasive species earlier in the invasion process. We are the

lead Federal agency implementing eDNA monitoring to detect the spread of invasive Asian carp in the Chicago area waterway system and in the Great Lake tributaries.

We have developed invasive species strike teams, highly trained rapid responders who deploy to national wildlife refuges across the Country to attack new outbreaks of invasive species before they gain a foothold, cause major damage, and subsequently cost taxpayers dollars.

In Wyoming, we are working with local landowners and conservation partners to investigate the effectiveness of naturally occurring weed-suppressing bacteria to combat cheatgrass infestations. Research is underway in the State to better understand the usefulness of these biological controls.

Combatting wildlife trafficking is another area of the Service's work where we are developing innovative solutions. With wildlife crime threatening wildlife populations, we are partnering with law enforcement using advanced evidence collection, forensics analysis, and intelligence to target and disrupt criminal organizations involved in poaching and wildlife trafficking.

This work also includes technology to detect poaching, detection dogs to track evidence from poaching scenes and find illegal wildlife in shipments, and new genetic analysis techniques to identify the geographic origin of seized wildlife

products.

We have also established innovative public-private partnerships with Jet Blue and Discovery Communication to raise awareness for wildlife trafficking and drive down consumer demand for illegal wildlife products.

Simply put, our mission to sustain America's natural heritage for the enjoyment of future generations depends on our ability to strengthen and expand our partnership work, using the latest innovations in technology and wildlife management practices.

Thank you again for the opportunity to testify, and I would be happy to answer your questions at the end of the panel.

Thank you.

[The prepared statement of Mr. Kurth follows:]

Senator Barrasso. Well, thank you so much for being with us and sharing your thoughtful testimony.

I would like to now turn to Dr. Jamie Reaser, who is Executive Director of the National Invasive Species Council, the U.S. Department of Interior.

Thanks for joining us.

STATEMENT OF JAMIE K. REASER, PHD, EXECUTIVE DIRECTOR, NATIONAL
INVASIVE SPECIES COUNCIL (NISC) SECRETARIAT, U.S. DEPARTMENT OF
THE INTERIOR

Ms. Reaser. Mr. Chairman, Ranking Member Carper, members of the Committee, thank you for the opportunity to appear before you today at this hearing on innovations in fighting invasive species and conserving wildlife. This is a particularly important topic for the National Invasive Species Council, since fostering innovation is one of the Council's priority areas of work.

I will summarize my written testimony, which has been provided for the record.

Invasive species pose threats to all aspects of national security and well-being, and have particularly devastating impacts on the environment, health, infrastructure, and the economy. The National Invasive Species Council, known as NISC, is the interdepartmental body charged with providing the vision and leadership necessary to coordinate, sustain, and expand Federal efforts to safeguard the interests of the United States from the impacts of invasive species. The Council is comprised of the senior-most leadership of 13 departments and 3 White House offices.

As you know, the invasive species issue is complex and challenging. It requires a unified, coordinated approach across

all levels of government and in partnership with affected communities. It also requires a "we can do this" perspective. Investments in technology innovation can be game-changing. They are demonstrating that seemingly insurmountable challenges can be overcome with substantial returns on investment. Technology innovation is helping us change the conversation from "can't" to "can" and "let's get it done now."

The current priorities of the Council's work to advance technology innovation are included in my written testimony. I would like to make a few general points about technology innovation in the context of invasive species.

First, in order to be effective, advancements in technology innovation don't require substantial investments in time or money. There are numerous low-tech innovations being made with relatively rapid, cost-effective outputs.

Many of the technologies that exist that could help us prevent, eradicate, and control invasive species already exist, but they were developed for other applications.

Opportunities are emerging to put a comprehensive toolbox together to address some of the most important invasive species challenges.

Fourth, best practices for technology innovation are context-specific. One approach will not fit all.

And, finally, in order for technologies to make a real

difference on the ground, we need to advance scientific research, as well as regulatory systems, public education initiatives, and the international activities that create and maintain the enabling environment for technology application.

My written testimony lists several species-specific examples that support these points. I am just going to mention two here.

Opportunities for reducing the spread and impact of cheatgrass in western rangelands are being improved through a combination of surveillance and mapping technologies, as well as biocontrol, chemical control, and genetic engineering, for example, to reduce herbicide resistance.

In eastern wetlands, opportunities for controlling, perhaps even some day eradicating, nutria are being improved through advancements in snare, trap, and attractant technologies, as well as the use of artificial resting platforms, camera traps, DNA sampling, detector dogs, and what are referred to as Judas nutria, nutria that are captured, sterilized, then radio-collared, re-released, and followed in the hope that they will lead trackers to other nutria.

This is a particularly timely hearing for NISC. As already mentioned, we recently cohosted an Innovation Summit on invasive species, the first-ever meeting to address technology innovation for invasive species from scientific, regulatory, and social

perspectives. More than 300 people participated, including invasive species scientists and managers, technology innovators, experts in technology innovation, and technology grant makers.

A report that summarizes the key points made by the participants and identifies opportunities for Federal leadership on technology innovation explicitly in the invasive species context is anticipated at the end of the month.

In conclusion, I would like to underscore the fact that investments in technology innovation and application can represent a long-term cost savings compared to the approaches currently available to address invasive species challenges. These investments can have substantial payoffs, potentially in the millions of dollars for a single species.

Mr. Chairman, Ranking Member, members of the Committee, thank you for the opportunity to testify. I am happy to address the Committee's questions regarding NISC's role in advancing technology innovation so that we can change the conversation from "we can't" to "We can do this. Let's get it done."

[The prepared statement of Ms. Reaser follows:]

Senator Barrasso. Dr. Reaser, thank you very much for joining us, for sharing your testimony.

I would like to next turn to David Ullrich, who is Chairman of the Great Lakes Fishery Commission.

Thanks for joining us today, sir.

STATEMENT OF DAVID ULLRICH, CHAIRMAN, GREAT LAKES FISHERY
COMMISSION, ANN ARBOR, MICHIGAN

Mr. Ullrich. Thank you very much and good morning, Chairman Barrasso, Ranking Member Carper, and all members of the Committee today. My name is David Ullrich, as the Chairman said. The Great Lakes Fishery Commission has been actively engaged in the management of sea lamprey for many, many years.

The Great Lakes and St. Lawrence region is an economic powerhouse for the United States and Canada. The Fishery alone generates roughly \$7 billion in economic activity annually for the Great Lakes. Unfortunately, the Great Lakes are under assault from over 180 different types of invasive species that inflict more than \$5.4 billion in annual damages to our resources.

The history of aquatic invasions has shown that people are left with few options to control a species once they are introduced and spread. Innovative solutions, which is why we are here today, can make a big difference. The highly successful sea lamprey program provides an excellent example.

As you can see from the picture, they are not pretty. They are gruesome, in fact, and they attach to fish with their suction cup mouths. They dig their teeth into the sides for a grip, and then their tongues are used to rasp in through the scales and the skin with their sharp tongue, and then they

inject an anticoagulant in and then they remove the body fluids from the fish.

Senator Carper. Mr. Ullrich?

Mr. Ullrich. Yes, sir.

Senator Carper. What is the circumference or the diameter of the photo?

Mr. Ullrich. Oh, I don't know, they would be about a couple inches, something like that. Not real big. They are long and skinny, but they attach right on the side and then do their work.

They enter the Great Lakes through the shipping canals and, having no predators and lots of food, inflicted horrendous damage on the fishery and the hapless fishers.

By the way, when you join the Fishery Commission, you are required to have one put on your arm for a little while and see if you are tough enough to be on the Commission.

[Laughter.]

Senator Barrasso. I volunteer Senator Carper as a new member of the Commission.

[Laughter.]

Mr. Ullrich. Do we have a sea lamprey?

Senator Carper. We did that in my fraternity initiation.

Mr. Ullrich. Okay. Very good.

[Laughter.]

Senator Carper. Second to waterboarding.

Mr. Ullrich. Okay.

Over the years, we have reduced the lamprey populations by 90 percent in most of the Great Lakes. In fact, we are at a 30-year low in Lake Huron, a 20-year low in Lake Michigan, and near targets in two of the other three lakes.

As the chart next to me, now the chart, will show you, we have gone from losing 100 million pounds of fish per year to only 10 million pounds. That is still too many, but we have made tremendous progress.

The \$7 billion Great Lakes Fishery would not exist were it not for the sea lamprey control program. The Commission and its partners have achieved this remarkable level of success through innovation, persistence, technology, and sustained binational commitment. We work hand-in-glove with the Canadians on this.

The work started in the 1930s and 1940s on this, and the first breakthrough was in 1957, where one chemical, a lampricide, was found out of 10,000 different chemicals that really got in and destroyed the sea lampreys. We integrated barriers into the work in 1970 to block their migration and spawning habits. We continue to use traps and innovate these traps, and also have developed innovative techniques in larger bodies of water on the application of the lampricide.

Several approaches are emerging that are particularly

promising, and this is what is especially important for the future, and that is the sea lamprey genome has been sequenced. This achievement will allow science to customize control techniques and exploit the sea lamprey's life cycle. We have also detected pheromones, which sea lampreys use as odors to detect in minute concentrations what directions they ought to go.

We are concerned about dam removals. Although it is a good thing for fish passage, it is a bad thing for lampreys; it opens up more areas for spawning. So we are trying to build some smart fish passage systems.

It would not be the successful approach it is today without innovative governance arrangements. The Fishery Commission is accountable for making this happen with Fish and Wildlife and Department of Fisheries and Oceans. We know that a single invasive species can cause huge damage. Prevention is the key and we need to continue to work to find more innovative approaches in the future.

Thank you very much for allowing me to testify today.

[The prepared statement of Mr. Ullrich follows:]

Senator Barrasso. Well, thank you very much for your thoughtful testimony.

I appreciate all of the witnesses.

We will start with some questions. Some of the Committee members may need to come and go, so if we don't have a chance to get to all the questions, some may be submitted in writing, and we would ask you to respond to those.

But I wanted to start with Mr. Kurth and then ask Mr. Nesvik to weigh in as well.

Mr. Kurth, in your written testimony you highlight the success of the Partners for Fish and Wildlife program. You called it a primary tool for collaboration with landowners. Should this program be reauthorized? What role should the program have when it comes to fighting invasive species and promoting wildlife conservation?

Mr. Kurth. The Partners for Fish and Wildlife program, in my opinion, is one of the most effective programs the Fish and Wildlife Service has. We not only do great work, but we leverage our investments sometimes 4 to 1 or even more. The Administration hasn't taken a position on an authorization bill, so I can't comment on specific authorization, but certainly the Fish and Wildlife Service wants to see this important conservation work continue into the future.

Senator Barrasso. So, Mr. Nesvik, can you tell us if you

agree that the Partners for Fish and Wildlife is an effective tool and is working for Wyoming?

Mr. Nesvik. Yes. Thank you, Mr. Chairman. I would agree with Mr. Kurth. Yes, in our experiences in Wyoming over many, many years of working with landowners, this program has been marked with success. Landowners particularly like this program because it is voluntary, the matching requirements are more flexible than some of the other government programs, and it is really focused work that is partnership-focused.

There is a project that is currently going on in partnership with the National Invasive Species Council, private landowners, the Department, the University of Wyoming, our weed and pest districts, BLM, Forest Service, NRCS, many, many partners to focus on new biological controls for some invasives. So that is just one of many, many examples. In Wyoming, though, in the past, this Partners program has focused mainly on wetlands and then also on invasive species work with private landowners.

Senator Barrasso. Thank you.

Mr. Roberts, you mentioned the article from the New York Times yesterday that I have here. It is a watchful eye on wildlife coming out of Malawi. Very thoughtful. It features the World Wildlife Fund's partnership with Google. As you mentioned, use of imaging and drones to combat the poachers. It

mentions some limitations of the drones, like the need for human operators who may be distracted to monitor other activity in order to detect poachers and raise alarms.

Noted in the article are nonprofit university researchers, as well, developing software that can be differentiating between humans and animals so the rangers can be automatically alerted when there is a good chance that poaching is occurring and they are detected.

Do you believe things like the XPRIIZE competition could encourage innovative efforts that would then maximize the ability of drones to fight poaching and to develop maybe other technologies that could also help solve wildlife conservation challenges?

Mr. Roberts. Yes. Having been in the Maasai Mara with the FLIR cameras late at night, you do see poachers. But you are also reminded by how many animals there are out there, and it is like Grand Central Station. New technologies, these XPRIIZES are extremely helpful. We were a part, through traffic of USAID, XPRIIZE competition that ended up generating some incredible breakthroughs on funding whistleblower programs, machine learning technologies to help track illegal trades, genetic programs to help track the trade in pangolins which is like an armadillo on steroids. It is the most traded animal in the world. And we love these XPRIIZE competitions as long as when

you award the prize, you have thought about how do you implement the winner over time, and that requires capacity and accompaniment on the ground.

Senator Barrasso. Thank you.

Mr. Nesvik, on technology we talk about the issue of drones. Clearly, drones can help reduce poaching. Can you tell us what steps Wyoming Game and Fish Department is taking to ensure respect for our constitutional rights, the constitutional rights of Americans when deploying advanced technology like drones?

Mr. Nesvik. Certainly, Mr. Chairman. First of all, the work that we have begun to explore, we haven't had a lot of opportunities because of the limitations of lower cost UAV technology. We haven't had a tremendous amount of opportunity to use them with a law enforcement application to this point, but some of the things that we have considered as we have thought through that is the fact that the activities that we would focus UAVs on would be activities that we would otherwise be able to do in a manned aircraft; you would simply be doing it with a lighter payload and without anybody in the airplane.

Secondly, in a very targeted and focused manner in places where illegal activity is known to exist, for example, in Wyoming, in our western mule deer winter ranges, we know every year that there are folks that are out there attempting to take

advantage of very vulnerable big mule deer that are worth a lot of money and that are also worth a lot to those folks that choose to exploit them. So focusing the use of UAVs in places where we know there is criminal activity on public lands helps to really ensure that we are staying well within the bounds of the Constitution.

Senator Barrasso. Thank you very much.

Senator Carper.

Senator Carper. Thanks.

I mentioned during my opening statement the publication National Geographic late December talking about the agreement that had been reached by our president and the former president of China, and it was actually a very encouraging article. Should we be encouraged by that agreement in terms of what it means for the trade of ivory in that country, those countries, our Country and around the world? Should we be encouraged or not?

That would be for anybody.

Mr. Roberts. I would be happy to address that.

Senator Carper. Please.

Mr. Roberts. It was a groundbreaking commitment on the part of China. They committed to close their market within a year, by the end of 2017. China is by far the biggest market. And so that is going to make a huge difference. It is

enormously encouraging.

But the wellspring of that announcement on the part of China was the announcement on the U.S. to do the same, and the U.S. moved first. So these bilaterals between countries are essential. And now we just need to help the Chinese government execute against this commitment, and our program in China is working to do that by creating lots of public awareness and demand for non-ivory products as wedding gifts and beyond.

Senator Carper. All right, thank you.

Mr. Roberts. Huge gamechanger.

Senator Carper. Good. Thank you.

If we were able to pursue all the ideas that you discussed here in your oral testimony and your written testimony today, if we were able to pursue all those ideas today, how might that affect the number of species that end up on threatened or endangered species lists?

Would you like to go first, Mr. Ullrich?

Mr. Ullrich. I am sorry, could you --

Senator Carper. No, I only say it once.

Mr. Ullrich. Okay.

[Laughter.]

Mr. Ullrich. The endangered species or the invasive species? I am sorry, I was --

Senator Carper. I will just restate the question, okay?

Mr. Ullrich. Yes. Thank you.

Senator Carper. You have given us a lot of ideas in your written testimony and your oral testimony. If we were able to pursue them all, or most of them, that you discussed today, how might that affect the number of species that end up on threatened and endangered species lists?

Mr. Ullrich. Boy, that would be hard to tell. I would have to get back to you on that one. We really have to prioritize on the ones that we deal with, as opposed to dealing with all of them. And certainly, sea lamprey has been the top concern. The biggest threat coming in, which really could have an effect on a lot and perhaps lead to endangered species, is the Asian carp, and a tremendous amount of work has been put forward towards that. So holding back the invasive species does, I would hope, keep the endangered species list shorter.

Senator Carper. All right, thank you.

Others, please. Mr. Kurth?

Mr. Kurth. I think that the problems around the world vary. I think that the illegal hunting and trafficking in wildlife in other countries, with these technologies we can greatly, I think, reduce the threat to many of these species. Of course, in the United States, legal hunting is an important management tool for us and it doesn't pose threats like that. But overall, as there continues to be a growing population and

stress on habitat, we are going to have to find techniques to maximize our management capability.

In this day and age, wildlife need management, and the secret for us to keep things from getting in trouble is to have good habitat that is well managed by professional managers.

Senator Carper. All right, anyone else on this question? Yes. Dr. Reaser?

Ms. Reaser. I am happy to take the invasive species perspective. There was a study done over a decade ago now, maybe 15 years ago, by David Wilcove and colleagues that estimated that 42 percent, at least, of the endangered species that are listed are driven in that direction by invasive species impacts. So anything that we can do to reduce the current pressures that invasive species have on our native flora and fauna, and prevent new invasives from entering the Country through these technologies should reduce not only the pressures on those animals and plants that are currently listed, but on those that might be heading towards the listing process.

Senator Carper. All right, thanks. If we have a chance for a second round, I don't know that we will, but, Colonel Nesvik, I want to come back and ask you to talk with us about someone might hear about this hearing today and hear us discussing the Partners for Fish and Wildlife, how might they participate. It sounds like a lot of folks are, and it is good

for them and for our planet. So I want to come back and ask you more about that. Thanks so much.

Senator Barrasso. Thank you, Senator Carper.

Senator Inhofe.

Senator Carper. By the way, we have another colonel here, right over there.

Senator Inhofe. We do?

Senator Carper. Army. Army.

Senator Inhofe. We do, we do.

First of all, let me say to Mr. Kurth I am glad we talked for a little while about the Partners for Fish and Wildlife, because when Dan Ashe had that job, during his confirmation I extracted from him a commitment to come out to Oklahoma, and he actually did two of them out there in western Oklahoma. And I really believe, in spite of the fact that, as a general rule, Democrats normally like to have things emanating from Washington, but I think it was an eye-opening experience.

Did you ever talk to him about the trips that he made out there? One was in Woodward, where I happened to have been this past Sunday; and the other in the southwestern part of Oklahoma. But it showed very clearly that the owners, the landowners are every bit as, are more concerned about the conservation issues on their lands than are the bureaucrats in Washington.

Mr. Kurth. Senator, I have talked to Dan many times about

those trips, and I think he found those very insightful and instructive. People who make their living off the land, by the very nature of their business, have to be good stewards. A rancher is not going to make a living if he is not properly managing his grazing regimes. There is a saying that became famous during the sage grouse planning that is what is good for the bird is good for the herd. That came from a rancher in Oregon.

Senator Inhofe. In a minute, I will talk about the burying beetle, and we will see if that fits in.

Mr. Kurth. Well, the burying beetle is a little different critter.

[Laughter.]

Mr. Kurth. I didn't think we would avoid that one today.

But, yes, we work hand-in-hand with ranchers. Two-thirds of the wildlife habitat in this Country is on private land.

Senator Inhofe. And the owner of the land is the one who is most concerned about it. I think that was a good move that we made, and we have been trying to enhance that program in answering the question. If you find out for any reason you don't think it is going to be authorized, let us know, because we can encourage that.

I want to just mention one thing about the hunters and the fishermen, the contributions that they make, the fact that not

just in the funding through the duck stamps and all the contributions they make through excise tax on firearms and so forth, but they really are involved. And I would ask perhaps both of you, Mr. Nesvik and Director Kurth, if you can both speak to the hunting and fishing communities and the conservation and the positive impact they have, and then maybe even move on to how they can be used more effectively in the invasive species. I know that in our case, in the State of Oklahoma, wild boar and some of these others, we are in a position to be used better than we are being used now.

Any comments that you can make on that?

Mr. Kurth. Well, certainly sportsmen are the original conservationists in this Country, going back to President Theodore Roosevelt, a founding member of the Boone and Crockett Club, and their work all across this Country --

Senator Inhofe. What club?

Mr. Kurth. The Boone and Crockett Club, a great sportsmen's organization that still exists today.

Senator Inhofe. I don't belong to that one, I don't think.

Mr. Kurth. He established our first national wildlife refuge and 50 other national wildlife refuges. Sportsmen have been involved in almost every aspect of our business, from being members of local hunt clubs that sponsor projects to working with us on invasive species. We have active volunteers in

invasive species, and they do more than just train.

One of the easiest things that takes manpower is to actually go out and map where these invasive species are so strike teams and others can come behind, and we can give sportsmen or other volunteers a GPS unit and they can take a stroll out on the land and help us to learn and map so our treatment can be more effective. There is almost no end to the number of innovative ways that sportsmen help.

Senator Inhofe. Do you agree with that, Mr. Nesvik?

Mr. Nesvik. Yes, Senator, I do. And I can tell you that from my experiences in Wyoming and other western States, including Oklahoma, I have colleagues in Oklahoma that I have worked with often, and I can tell you that there is no one more interested in wildlife management agencies doing a good job of protecting their resource than sportsmen. And, as Mr. Kurth indicated, since the beginning of wildlife conservation in our Country, they have been a major part of that and really the founder.

Senator Inhofe. They are also paying for a lot of that stuff, too.

Now, I do want to get around to one question, and I would like to have you, Mr. Kurth, provide an update on where the petition to delist the American burying beetle stands today and when we should expect the 12-month review of the lesser prairie

chicken petition.

Mr. Kurth. Well, Senator, let's start with the beetle. As you know, in March of 2016 the Service made a substantial finding on the petition to delist the American burying beetle. Prior to receiving that petition, we had initiated a species status assessment to support future conservation decisions, recovering planning. That status assessment is drafted and is undergoing scientific peer review now, and we expect it to be complete this summer, and that status assessment will be the scientific underpinning.

Senator Inhofe. All right, this summer. Let's go, then, on to the 12-month review of the lesser prairie chicken.

Mr. Kurth. Yes. In that process, we expect to be able to make that determination by this September. We are awaiting the annual report from the Western Association of Fish and Wildlife Agencies and the result of their survey work that they have been doing here this spring to update and inform that species status assessment.

Senator Inhofe. Yes. We will be standing by. Thank you.

Senator Barrasso. Senator Whitehouse.

Senator Whitehouse. Thank you all.

I would like to follow up on Senator Inhofe's comment about the important role of sportsmen in tracking and gathering information for us by echoing that fishermen have an equally

valuable role. I very much hope that, as we proceed with the initiative, Mr. Chairman, which I appreciate very much, that we make oceans and coasts a significant part of this, as well as upland and fresh water.

As you know, our side of the aisle is heavily coastal. I think only Senator Sanders and Senator Duckworth aren't ocean coastal, and they have major lake coasts. On the other side of the aisle there tend to be a lot of, sadly, landlocked States. Their good news is that, with climate change, the ocean gets a little closer every day.

[Laughter.]

Senator Whitehouse. The focus on oceans and coasts, though, is I hope one that we will maintain. We have seen enormous invasive species that are actually not just moving because of climatic changes that allow them new habitat that they didn't have access to before, but we see global shipping exploding and we see ballast water and things like that allowing for the transit of invasive species in a way that the land doesn't quite match. So I hope that we can focus on that.

I particularly want to thank the members of this Committee who are members of the Oceans Caucus, and I thank Senator Inhofe for joining our Oceans Caucus just recently, because one of the first things we worked on was pirate fishing; and we got four treaties passed, which may not seem like a big deal, but we did

it in an afternoon. And to timespan the previous four treaties the Senate passed, you would have to go back nine years. And we got the enabling legislation passed. And now, with those treaties and those laws and technology, we are starting to see some real damage done to pirate fishing.

One of the worst places was Indonesia. It is an archipelago of a lot of islands with a huge amount of ocean around it. Their fisheries minister, I think, has sunk more ships in this century than the United States Navy has. She is just constantly blowing up pirate fishing vessels and putting them to the bottom of the ocean. She actually had the Chinese more or less attack one of her vessels and carve away the one that they were trying to tow in to sink because it was a Chinese-based pirate fishing vessel.

But we are seeing satellite imagery and computers that can track the satellite imagery and look for fishing patterns. We are seeing technology that looks for when the transponders turn off in boats as a signal that now they are up to bad behavior because they don't want their transponders to track them. We are seeing signals in fish, particularly high value fish that you use to sort of track their whereabouts and see where they go, that suddenly end up in an amazingly straight line out of their habitat, going for days across the ocean towards a specific port, and then you know, guess what, they are onboard a

ship that caught them illegally.

We have drones that have a role. And as Mr. Kurth and Senator Inhofe were talking about, there is a networking capability where, with GPS and simple phones that have camera applications, you can get a whole bunch of even very artisanal fisherman to simply take pictures of boats that they see out fishing, register where they are, triangulate, if you need to, nail down the identification, and use that as evidence to go out and enforce.

So the open ocean is no longer such a safe haven for this organized crime activity as it used to be thanks to all these steps going forward.

Let me just ask one question of each of you. I think it is a simple yes or no question. Do you model climate change projections into your invasive species planning?

Mr. Nesvik. Senator, as far as modeling climate change with regards to invasive species --

Senator Whitehouse. Is that a factor in your planning model I guess would be a better way to ask the question.

Mr. Nesvik. Certainly. It certainly is.

Senator Whitehouse. Carter?

Mr. Roberts. Yes.

Senator Whitehouse. Mr. Roberts? Sorry.

Mr. Roberts. Yes. Factoring in climate change into all of

our work, as the world is changing so much around us, is fundamental to making sure that our conservation efforts last.

Senator Whitehouse. Mr. Kurth?

Mr. Kurth. It is a factor that we look at in all of our work, and sometimes it is very important; other times it is not the most significant factor.

Senator Whitehouse. Ms. Reaser?

Ms. Reaser. A number of the departments under the Council do as well.

Senator Whitehouse. And Mr. Ullrich?

Mr. Ullrich. Yes.

Senator Whitehouse. Great. My time has expired.

Thank you very much for hosting this hearing. I think this is an area where we will be able to do some very good work together.

Senator Inhofe. [Presiding.] Thank you, Senator Whitehouse.

Senator Ernst.

Senator Ernst. Thank you, Mr. Chair.

Senator Whitehouse, I do have water on either side of Iowa; it is the Mississippi River and the Missouri River.

Senator Whitehouse. That is right. Rivers count too.

[Laughter.]

Senator Ernst. Thanks to our panelists today. It really

is an interesting discussion, so it is good to have you here.

Dr. Reaser, I will start with you, please. In Iowa, one of our newest and most significant invasive species concerns is the Palmer amaranth. It is a weed native to southwestern United States. It entered into Iowa through conservation seed mixes. In early 2016, this weed was in only five of our Iowa counties; and by the end of last year it was in 49 Iowa counties. And it is expected to be in all 99 counties by the end of this year.

What concerns me and the agricultural community is that so much of this weed's potential impact harms our crops and the crop yields, and it has added costs to farmers. Studies have shown that it can reduce soybean yields by up to 80 percent and our corn yields by up to 90 percent. So that is very, very significant for our farmers. It also forces farmers to use herbicides and to utilize other eradication methods such as tillage on what is traditionally no-till land.

Is this an issue that is currently being tracked through the National Invasive Species Council?

Ms. Reaser. Thank you for the question. It is a significant challenge and area of concern. My team, the Council Secretariat, was contacted by the U.S. Department of Agriculture with their concerns. We have a non-Federal advisory committee that includes stakeholders from seed trade organizations, and we did outreach through our relationships to alert stakeholders in

the seed trade circles that this was an issue of concern and asked them to increase the vigilance and communications within their networks.

Senator Ernst. So you would say there is heavy collaboration going on between different local, State, and Federal agencies?

Ms. Reaser. I can't speak to the agencies; the State and Federal agency representatives would be better spoken in that regard, but it has been brought to our attention and we did reach out to our stakeholders, recognizing the importance of the issue.

Senator Ernst. Very good. Yes, it is a very, very tough issue that we are facing right now, and I know many other States are, too.

Mr. Nesvik, thank you very much for your service. I appreciate it greatly, from one Guardsman to another.

Mr. Nesvik. And you as well, Senator.

Senator Ernst. Thank you very much.

When I examine a policy issue that comes in front of us, in this case an invasive species such as Palmer amaranth, and the management of that, as well as wildlife conservation, one of the first things that I look at is how State and local governments are working together to inform the Federal government on its policy objectives. As a State wildlife official, do you think

that the Federal partners that you are working with give you the discretion you need to make the decisions that are right for you, right for Wyoming and its conservation efforts?

Mr. Nesvik. Well, Senator, that is an excellent question, and I guess the short answer to that question would be yes, because we have very mutual interests. The Federal agencies that we primarily deal with on these types of issues with invasive species in Wyoming are agencies that are land managers, so they have no interest in having invasive species dominating their landscapes and inhibiting their abilities to manage their lands.

So there is a mutual goal there between the State agencies and the Federal agencies. As we talked earlier about the Partners program of Fish and Wildlife, oftentimes those programs are executed with multiple Federal agencies, as well as private, nongovernmental partners when those things are executed.

So, again, maybe a little bit longer answer to the short answer of yes.

Senator Ernst. No, that is great. So that is where we see more of the collaboration going on, is through those channels, then.

Mr. Nesvik. Yes, Senator.

Senator Ernst. Very good. Well, I appreciate it. My time is expiring. I will yield back.

Thank you.

Senator Inhofe. Thank you, Senator Ernst.

Senator Duckworth.

Senator Duckworth. Chairman Barrasso, Ranking Member Carper, thank you for convening this important conversation. I want to extend a warm welcome to all of our witnesses, especially to Mr. Ullrich, who I claim as being from Chicago, having spent much time there, even though he now lives in a neighboring Great Lakes State.

These gems in the Great Lakes are home to the world's largest freshwater system. They provide over 40 million people with drinking water, 1.5 people with jobs, and generate billions of dollars a year in economic revenue. Approximately 15 percent of the U.S. gross domestic product originates within the Great Lakes basin. And as we have heard from Mr. Ullrich, the issue of invasive species is of great concern to the region. And while we have had some successes combatting these issues, we do need to prioritize issues within the invasive species battle.

Combatting invasive species in the Great Lakes can't simply be a zero-sum game, and we have to figure out a road forward that balances the role of the Great Lakes in our economy, as well as with the environment.

Mr. Ullrich, it is budget season here in D.C. and any day we will get the Trump Administration's proposal to fund the

Government, including agencies like NOAA and EPA. Are you concerned that the budget cuts that we are expecting the Trump Administration to propose will hinder the region's efforts towards combatting invasive species?

Mr. Ullrich. Thank you for the question, Senator Duckworth. Yes, we are very concerned. The funding for the Great Lakes Restoration Initiative has been a key element in keeping the Asian carp out of the Great Lakes, which could be one of the most devastating invasive species ever to come into the Great Lakes. All you have to do is ask the people on the Mississippi River and the Illinois River and the Missouri River and these other rivers about what they have done to the fishery in those areas. That funding has been critically important. I believe over \$150 million has been spent over the last seven years to stem the tide of the Asian carp.

The continued funding through the State Department of the Great Lakes Fishery Commission is critically important to the sea lamprey. You have to keep on top of them; otherwise, they are going to come back and take over. They just don't go away.

So on the one hand the priority of the prevention of the Asian carp getting in and, on the other hand, the continued management of the sea lamprey is absolutely critical. It would be nice if it were free, but it is not.

Earlier questions came to the issue of the fishery

community and fishers and commercial fishermen. They are fully integrated into the work that we have on the Great Lakes Fishery Commission, and they are our eyes, ears, and fishing poles out on the lake all the time and have a huge stake in it, and we incorporate their thinking. Local, State, Federal Government, Tribal Governments all work together on this effort. But really the lifeblood is the funding that comes through, and this could have a devastating effect on the Great Lakes if it were cut to the degree that has been discussed.

Senator Duckworth. Well, in the case of the Asian carp, it is so invasive that you don't even need fishing poles; you just hold a net up above your boat and they jump right into it as you are driving along the Illinois river.

Mr. Ullrich. They are quite dangerous for jet skiers, water skiers and others. I have seen it myself and it is pretty frightening.

Senator Duckworth. Can you speak a little bit, when it comes to the bighead and the silver carp, to the role of locks and dams and needed investments in infrastructure, specifically integrating lock improvements with technology innovations at the locks that could allow barges to move, but also blocking the invasive species?

Mr. Ullrich. One of the key things that we are looking at is an existing lock and dam system referred to as Brandon Road.

Between the U.S. Geological Survey and a number of other Federal and State agencies and U.S. Army Corps of Engineers, they are looking at a number of different innovative approaches to allow the barges through, but to keep the invasive species in this situation from getting up to Lake Michigan, and we hope eventually to provide two-way protection between the Great Lakes and the Mississippi River as well.

There has been a temporary halt put on that work, which is very dangerous because we have been going too long and our luck is going to run out if we don't get those systems identified and put in place. So here the work with the Corps of Engineers, USGS, Fish and Wildlife, the State agencies, I represent local government in my day job, and all of this is really important, so going ahead on this Brandon Road project is critically important.

Senator Duckworth. Thank you. I very much appreciate you being here and your many decades of work on this issue.

I yield back.

Mr. Ullrich. Thank you.

Senator Inhofe. Thank you, Senator Duckworth.

Senator Rounds.

Senator Rounds. Thank you, Mr. Chairman.

Mr. Nesvik, I would like to talk a little bit more about Asian carp, as Senator Duckworth brought up the discussion. I

appreciate the fact that you are here today to share your perspective as a State-based professional working to combat invasive species. In my home State of South Dakota, the Asian carp has become an emerging threat to not only our rivers and lakes, but literally, as pointed out earlier, the physical safety of boaters. In fact, they are known to leap out of the water several feet.

I understand from your testimony that you are optimistic about the use of next generation thermal cyclers to detect the species. Relying on your assessment of the beta testing currently being conducted, how you envision a State like South Dakota potentially employing this type of equipment?

Mr. Nesvik. Excellent question, Senator. First of all, I will tell you that the State of Wyoming is certainly interested in helping you with the Asian carp issue in South Dakota. Our approach with invasive species to this point has been to try to keep them outside of the borders of Wyoming, and so far we have been successful with that. Our primary threats have been with quagga and zebra mussels.

But the primary inhibitor with the use of those kinds of technologies right now, from a State agency's perspective, is the fact that their range for those UAVs that are cost-effective, those imagers that are cost-effective and affordable for a State agency, their ranges and their power requirements

are such that they are not employable.

For example, a UAV that can range up to about 15 kilometers and has a flight time of an hour is about a \$50,000 investment, so it is significant. And that is where I think there are opportunities for innovation to be able to make those kinds of technologies more cost-effective for a State.

Senator Rounds. So we have a ways to go before that is going to be something that is going to be in the picture in terms of a good tool to use with regard to invasive species like the Asian carp.

Mr. Nesvik. That is certainly my assessment.

Senator Rounds. Thank you.

Mr. Ullrich, thank you for appearing today. During my time in the Senate, and on this Committee specifically, we have seen the importance of sound science across government. In your testimony, you state that without the most accurate and complete scientific data, the inroads that were made reducing the presence of the sea lamprey would have been impossible.

You interact with a variety of different Federal agencies in your capacity as Chair of the Great Lakes Fishery Commission. What additional steps do you think the various Federal agencies can take to better develop scientific information to manage invasive species?

Mr. Ullrich. Excellent question, Senator. First of all, I

want to say that I believe, and I have been in this business for 44 years now, that at the Great Lakes Fishery Commission I have seen probably one of the best mergers of science and policy to come together. I think, number one, it is really important that policymakers do listen to the scientists. Number two, cooperative efforts among the scientists at Federal, State, to a lesser extent local level, but really important is the indigenous peoples and Tribal peoples. They bring an important perspective to this.

Obviously, it needs funding, but, very importantly, cooperation across whether it is State lines. We work very closely with Canada on almost all that we do. Some of the best risk assessment work has come out of the Department of Fisheries and Oceans in Canada. We incorporate that together.

I think if you were able to see the cooperative effort going on on the Illinois River with Federal, State, local agencies, tribal groups, Canada, and the U.S., it is one of the best examples of cooperation on an effort like that, both at the scientific level and at the deployment level. We need much, much more of that. And having a common goal is really important, and having leadership articulate the importance of that goal does help to bring the scientists together with the policymakers and with the implementers. So that is very helpful.

Senator Rounds. Thank you.

Thank you, Mr. Chairman.

Senator Inhofe. Thank you, Senator Rounds.

Senator Booker.

Senator Booker. Thank you very much, Mr. Chairman. I am really grateful that the Committee is holding this hearing. Really, this is significantly urgent work, and I am grateful for the witnesses we have here.

Mr. Kurth, I would like to jump in, actually, on another issue. I understand that you have been a career professional at the U.S. Fish and Wildlife Service for 38 years, is that right?

Mr. Kurth. I have been working in conservation for 39 years; 37 with the Fish and Wildlife Service.

Senator Booker. Obviously, you must have gotten started in kindergarten, so I appreciate that.

Mr. Kurth. Bless you.

Senator Booker. Earlier in the career, though, you managed service for the Alaska Subsistence Program and you were manager of the Arctic National Wildlife Refuge for many years, is that correct?

Mr. Kurth. Yes, sir.

Senator Booker. So you know a little bit about, I think that is an understatement, managing wildlife and managing national wildlife refuges in Alaska, correct?

Mr. Kurth. Yes, sir.

Senator Booker. Are you familiar with the regulation published by the Service on August 5th, 2016, relating to the non-subsistence take of wildlife on national wildlife refuges in Alaska -- and take is basically killing -- the so-called Alaska Rule?

Mr. Kurth. Yes, sir.

Senator Booker. Do you have any doubt, or did the Department of Interior solicitor, the Department of Justice, or anyone express or at least those specific folks express any doubt or concern about the statutory authority of the Service to issue this rule?

Mr. Kurth. There was no concern about our authority.

Senator Booker. I am grateful for that, sir. And the rule only applies on national wildlife refuges, and does not apply on any private land or State-owned land in Alaska, correct?

Mr. Kurth. Correct.

Senator Booker. And what this rule does -- I have the rule right here -- is it prevents inhumane practices on our wildlife refuges such as specifically prohibiting the killing of mother bears together with their cubs, is that correct?

Mr. Kurth. That is one of the prohibitions, Senator.

Senator Booker. It also prohibits killing mother wolves and pups in their dens, correct?

Mr. Kurth. Yes, sir.

Senator Booker. It prohibits using planes to track and kill bears, right?

Mr. Kurth. Correct.

Senator Booker. And it prohibits using snares, which are these wires hanging around the necks of animals and steel jaw leg hold traps to kill bears on these national wildlife refuges, correct?

Mr. Kurth. Correct.

Senator Booker. Mr. Kurth, I think that this rule is vital, and I actually have a lot of, I will even use the word, love for one of my colleagues who is an Alaskan Senator who saw this more as a sovereignty issue. I don't want to get into that aspect of the debate or issue; I really am concerned about the inhumane treatment of animals and how this law, this rule specifically outlaws what I think are outrageous killings.

I don't think we should be allowing the killing of baby animals on our national wildlife refuges; this, to me, does not reflect who we are as a Nation. But I am sure that you know the House passed a CRA to abolish the rule and to prevent the Fish and Wildlife Services from ever adopting a similar rule to prevent these specific cruel practices. In other words, it is preventing the Federal Government from having the ability to stop what I believe are tragically cruel killing of pups and

others.

You know, I think this is outrageous and really hope that my colleagues will carefully study this important Fish and Wildlife rule and decide not to support a CRA. And the intention was not necessarily around sovereignty, I imagine, which is something that is worthy of discussion and debate, and maybe for Congress to act on, but really the inhumane practices.

And the last question I will ask, Mr. Kurth, in terms of wildlife management, sound management, you do not need these practices to successfully manage a Federal wildlife refuge, is that correct?

Mr. Kurth. And that is the distinction to be made. The State of Alaska has their rules and regulations to manage wildlife under their State regulations, and I won't judge that, but on national wildlife refuges the laws are different, and we enacted the rule that we thought necessary to administer the national wildlife refuges in accordance with the Alaska Lands Conservation Act and the National Wildlife Refuge System Administration Act; not to pass judgment on cruelty, but to manage those refuges according to the standards that we have been given.

Senator Booker. Okay. And it is not necessary, though, for the management to have those kinds of killing of pups and the steel traps. It is not necessary to do successful

management, is that correct?

Mr. Kurth. When we enacted the regulations, we did not find them necessary.

Senator Booker. Sot. I am grateful, again, for your years of service. Thank you for answering my line of questioning.

Thank you very much, Mr. Chairman.

Mr. Kurth. Thank you, Senator.

Senator Barrasso. [Presiding.] Thank you, Senator Booker.

Mr. Nesvik, any additional comments on some of the comments you just heard here from the last questioner? Did you want to weigh in on this discussion?

Mr. Nesvik. Mr. Chairman, I guess I wouldn't have anything to add. We certainly have a little bit different perspective in our State with regards to how national wildlife refuges are used, and those kinds of practices are not engaged in our few refuges that we do have in the State of Wyoming.

But, as Mr. Kurth indicated, there are some management tools that are humane and necessary, as long as they are regulated properly, that can be conducted that relate to some of those things that you talked about, Senator.

Senator Booker. Mr. Chairman, thank you for allowing Mr. Nesvik to make that point, because I think it is really important that these savagely cruel practices are not necessary, whether it is the State managing or the Federal Government

managing. The reality is these are inhumane practices that should be prevented in the United States of America on our Federal wildlife refuges, and I am glad to have two witnesses now testify that that is just not necessary to do.

Senator Barrasso. Thank you for the clarification.

I want to thank all of you for being here today to testify.

Dr. Reaser, I know that Senator Sullivan had a couple of questions he is going to submit in writing because he is now in the chair as the presiding officer in the Senate, so he wasn't able to return for those questions.

I was not going to head for a second round of questions, unless you had any closing comments, Senator Carper.

Senator Carper. Thanks so much.

I telegraphed my picture earlier with respect to just a practical explanation of how this partnership for fish and wildlife works. Could you just give us a practical, like if people, landowners, farmers were interested in joining, being part of this, how would they go about doing it?

Mr. Nesvik. Thank you, Ranking Member Carper. There is actually a backlog of interested parties, but basically when they have an interest they start with their local Fish and Wildlife Service person in their State and they begin the discussion, the dialogue there, develop the project, determine what the goals may be, and that is when the other partners,

specifically in my case, the State wildlife management agency, enters into the picture to kind of establish how the project may be completed, what the goals of the project may be, and other necessary partners. Then that is when kind of the next step after that is the development of those other partners so that the money that is provided by the Federal Government can be leveraged, as Mr. Kurth indicated in his testimony.

Senator Carper. All right, thank you.

Do any of you have anything else you want to add, given the conversation we have had, that you think is appropriate to add before we conclude? Please.

Mr. Ullrich. Senator, if I might, I have to say again that I deeply appreciate the focus on invasive species. I think if you talk to most Great Lakes scientists, they would probably say that the most devastating impact on the Great Lakes of all of the pressures have been invasive species. They have seriously disrupted the biological balance, and anything more that we can do will really enhance the environment and the economy of the Great Lakes region.

Senator Carper. All right, thanks.

Anybody else? Yes, please.

Mr. Roberts. I think it was Senator Inhofe who first raised this issue and Senator Whitehouse doubled down on it, and you just raised it as well, which is, both in the United States

and around the world, it is the role of local communities and private landowners and indigenous communities who are at the heart of the most lasting conservation efforts.

And the discussion about technologies and approaches to deal with poaching and invasives, the more we can rest on and build on the ownership of local communities and private landowners here and abroad, the more lasting those results will be, whether it is our work in the northern Great Plains depends upon ranchers and Tribes, and our work in places like Namibia and Nepal depends on local communities and indigenous groups, and that is the strongest, most lasting form of conservation.

And I would underscore the points that have been made in that regard, and particularly as you think about XPRIZES or challenges in the area of technology, to find a way to give a nod to local communities and their use of technologies, I would encourage you to think about that.

Senator Carper. Good. Thank you.

Mr. Kurth?

Mr. Kurth. I would just like to end with, sometimes it is easier to find a conflict between the Federal Government and the State, but our conservation ethic requires us to work every single day with our State colleagues. There is no stronger bond in conservation between the Fish and Wildlife Service and our State fish and game colleagues. We can't be successful without

them, and I just wanted to tip my hat to them.

Senator Carper. In Delaware, we value our partnership with Fish and Wildlife. I think your regional director is Wendi Weber.

Mr. Kurth. Yes.

Senator Carper. And she has been to our State any number of times, along with others of her colleagues. Thank you for that partnership.

Senator Barrasso. Well, thank you to each and every one of you for being here to share your testimony with us and to answer your questions in such a thoughtful manner. I thought it was a very productive hearing. I hope that you felt it was worth your time and effort.

We are going to keep the hearing record open for two weeks because there are some members that had to come in and out based on other obligations, and they will be submitting questions for the written record, and we would ask that you try to respond quickly to those.

Thank you. Since there are no other questions, the hearing is adjourned.

[Whereupon, at 11:41 a.m. the committee was adjourned.]