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WILDLIFE SECTION

**United States Senate Committee on Environment and Public Works –
Invasive Species Impacts**

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Good morning, I'd like to thank each of you for the opportunity to visit and meet with you to discuss a very real and significant problem that affects our entire country and not just my home state of Delaware, invasive species. My name is Joe Rogerson and I oversee Delaware's Species Conservation and Research Program within the Delaware Department of Natural Resources and Environmental Control's Division of Fish & Wildlife. My comments today will focus primarily on the impacts of invasive species on native wildlife and the habitats, but I'd be remiss if I didn't point out that the impacts of invasive species often have equal, and in some instances more significant impacts to public health and safety and our economy, commercial industries, agricultural producers, hunters, anglers and wildlife watchers, and many other groups. I've seen reports estimating the total impact of invasive species across our country to exceed more than \$100-billion annually, so this is a very real and significant problem as invasive species affect many facets of our lives.

Invasive species are a leading driver of biodiversity loss and in many instances one of the primary factors that result in the listing of many of the country's threatened and endangered species. State Wildlife Action Plans serve as the blueprints for conserving our nation's fish and wildlife and preventing species from becoming endangered. In 2005, each state, territory, and the District Columbia submitted their plan for approval to the US Fish and Wildlife Service as a condition for receiving funding through the State and Tribal Wildlife Grants program. The plans were recently updated with the latest science and information to guide conservation of over 12,000 species in greatest conservation need across the country. Along with identifying the species in greatest conservation need, each state identified threats and associated actions that could be implemented to reverse each threat. Recently, the content of each state's wildlife action plan in the Northeast region was summarized. Of the 2,918 species of greatest conservation need identified within the region, pollution and development were the most frequently cited threats, with invasive species closely following as one of several additional regional threats. States currently don't have sufficient resources to tackle all of the threats outlined within their wildlife

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action plans, so we are unable to fully address threats facing fish and wildlife populations from invasive species.

Following Executive Order (13312) signed by then President Clinton in 1999 to establish the National Invasive Species Council, the non-governmental Delaware Invasive Species Council (DISC) was also formed in 1999. The mission of the 120 member DISC is to protect Delaware's ecosystems by preventing the introduction and reducing the impacts of invasive species. DISC works closely with natural resource managers, biologists, and stakeholders to reduce invasive plants and animals and to promote native habitats. In 2017, I was part of Delaware's Ecological Task Force, which identified many threats that contribute to the decline, and in some cases extirpation, of native fish, wildlife, and plants in Delaware. Invasive species were one of the leading threats identified by the task force, in addition to pollution and habitat loss. Based on the recommendation of the task force, Delaware's General Assembly established the Delaware Native Species Commission in 2018 to bolster state efforts to reverse the trend of native plant and animal decline.

Of the more than 6,500 invasive species known to occur in the U.S., I would like to list a few invasive species that are or may become significant challenges in my home state of Delaware. Control of invasive species in Delaware and the surrounding region has been initiated in response to the invasion of *Phragmites* and nutria within our wetlands, northern snakehead fish and hydrilla plants within our waters, and Asian tiger mosquitoes that are a threat to transmit Zika and West Nile virus in our communities. More recently, efforts have been or soon will be taken in Delaware to monitor for lionfish, spotted lanternflies, and the Asian longhorned tick, as well as bats that have been infected with the non-native fungus that causes the debilitating White-nose Syndrome which has decimated populations of some bats species across the country, particularly in the Northeast. Along with a written copy of my oral statement today, I have included an appendix within the written statement that includes more in-depth information on the species I just described, but I would like to talk about some of the work being done back home in Delaware and a very good example of invasive species control that is occurring on the Delmarva Peninsula.

The control of *Phragmites* is a major priority in Delaware to reduce the impact of this highly invasive plant that outcompetes and replaces our native wetland plants, severely degrading these wetland habitats. An aggressive control program was initiated in Delaware in 1976 and to date more than \$6-million has been spent by my agency to control this species. While far from being eradicated, we have been successful at reducing the amount of *Phragmites* in Delaware, which has helped to restore the biodiversity and functions of our wetlands. Control of other invasive plant and animal species has required countless hours of agency staff time and funding and the help of volunteers to combat invasive species across Delaware, including within our state-owned wildlife areas, forests, and parks.

From where we sit here today, we don't have to travel far to see an example of a highly successful program to combat an extremely detrimental introduced invasive species. Nutria, a semi-aquatic rodent native to South America, were introduced to the Chesapeake Bay Region in the mid-1900s. Prolific breeding habits and a voracious and destructive feeding behavior caused extensive destruction of wetlands, which, if left unchecked, would have compromised the Chesapeake Bay. A federally-supported Chesapeake Bay Nutria Eradication Project initiated in the early 2000s helped turn the tide on this invasive and destructive rodent, effectively

eliminating all known nutria populations from over a quarter million acres of wetlands on the Delmarva Peninsula, with current efforts focused on removal of residual animals. A study completed by the Maryland Department of Natural Resources reported that, without decisive action, more than 35,000 acres of Chesapeake Bay wetlands could be destroyed by nutria in 50 years. The predicted impact of nutria destruction to Maryland's economy was dire, with losses exceeding \$35 million annually. Maryland watermen would have been hardest hit from the loss of tidal wetland fish and shellfish nursery areas that help replenish important and productive Chesapeake Bay fisheries. The study illustrated the economic costs to the citizens of Maryland and the entire Chesapeake Bay in terms of dollars lost to commercial fisheries, recreational fisheries, hunting, wildlife viewing, and related industries. Damage to the ecological services provided by healthy wetlands, such as storm protection, flood control, and water purification, would have made the overall destruction even greater than the economic findings indicated. The Chesapeake Bay Nutria Eradication Project is a classic example of how an invasive species can be controlled, in this case eradicated, with adequate funding and staff resources.

Hopefully, all of us recognize that invasive species are a significant problem facing our country. There are steps that individual states can do, and have done, to prevent invasive species from becoming established or spreading into new areas, but many of these species cause problems across state lines and over large geographic areas, which is where the federal government could further help tackle this problem. While not referring to invasive species, Benjamin Franklin's quote, "an ounce of prevention is worth a pound of cure" couldn't ring more true in terms of how we handle invasive species since it is more costly to deal with invasive species once they become established than it is to prevent them from entering in the first place. A couple examples of proactive invasive species "prevention" include increased invasive species surveillance of the goods and imports arriving in our country to prevent their introduction into the wild and some states restricting the possession of certain invasive fish and wildlife species to minimize the chance of their introduction into the wild. Furthermore, some states have restricted the sale and planting of certain species of invasive ornamental trees and shrubs that have the propensity to rapidly spread into new areas and outcompete native plants. Another example of some "prevention" includes regulations in some jurisdictions that establish weed-free forage programs for agricultural producers to minimize the spread of invasive and noxious weeds. There are many other similar programs to prevent or minimize the chance of new invasive species entering the country and preventing those that are already here from spreading into new areas. Unfortunately, the invasive species genie is out of the bottle. In addition to needing an "ounce of prevention" to prevent further introductions, we also need a "pound of cure" to control those species that are already here. Dedicated funding and personnel are needed to control, and in some cases eradicate, invasive species. The Chesapeake Bay's Nutria Eradication Project is a nearby example of what can be accomplished if we have the drive, determination, and resources. The longer we wait to tackle this problem, the more pervasive it will become and the more difficult and expensive it will be to address.

I again would like to thank each of you for giving me the opportunity to meet with you today to talk about the important issue of invasive species, and I look forward to additional opportunities and actions to combat invasive species. With that, I'll gladly take any questions that you may have. Thank you.

Appendix 1: Information concerning some of the more common invasive species and pathogens addressed and managed in Delaware.

INSECTS

Asian longhorned tick (*Haemaphysalis longicornis*)

Not normally found in the Western Hemisphere, these ticks were reported for the first time in the United States in 2017. Thus far this species has not been found in Delaware but surveys have been initiated. Asian longhorned ticks have been found on pets, livestock, wildlife, and people. The female ticks can lay eggs and reproduce without mating and thousands of ticks may be found at a time, or on an animal.

In other countries, bites from these ticks can make people and animals seriously ill. However, as of October 2018, no harmful germs have been found in the ticks collected in the United States but research is ongoing

Asian tiger mosquito (*Aedes albopictus*)

The Asian tiger mosquito, is a small black mosquito that was accidentally imported into the United States in the 1980s. It is about 1/4-inch long and has a white stripe down the center of its head and back and white bands on its legs.

The Asian tiger mosquito presents two major problems. The first problem is that these mosquitoes are a nuisance. If you live in an urban area and have a mosquito problem, Asian tiger mosquitoes are the most likely culprit. Unlike many other species of mosquitoes, Asian tiger mosquitoes are very aggressive daytime biters. The second problem is that Asian tiger mosquitoes may pose a health threat. They have been found to be a successful disease vector that is able to transmit diseases such as the West Nile and Zika viruses.

Emerald ash borer (*Agrilus planipennis*)

The emerald ash borer has been the most destructive forest pest in the history of pest introductions. In some of the most heavily infested areas, Ash trees have experienced a 99% mortality. Control options for this species include Ash tree removal or insecticidal treatment. One community in Delaware estimates that removal and replanting of Ash trees would cost their homeowners association \$600 thousand. Emerald ash borer was first detected in Delaware in 2016 but a population was not found.

The Delaware Department of Agriculture coordinated work with the United States Department of Agriculture to release parasitoid wasps which are natural enemies of emerald ash borer, in an effort to control the pest. In 2018, Emerald ash borer was discovered in several other locations in New Castle County, and parasitoids will be released in the spring of 2019 to control these new populations.

Red imported fire ant (*Solenopsis invicta*)

Red Imported Fire Ants are native to South America. They were introduced to Mobile, AL during the 1930's and have since spread throughout much of the southeast US. To date, they have established in areas as far north as coastal Virginia, however, they are regularly intercepted in nursery stock transported from the southern United States into Delaware. In the past 10 years they have been intercepted five times in our state.

Imported fire ants have been estimated to cause \$8 billion dollars of impact in the US and Puerto Rico. If the Red Imported Fire Ant is introduced to Delaware, economic impacts will be felt in Agriculture, as well as tourism, residential areas, golf courses, and nurseries.

Spotted lanternfly (*Lycorma delicatula*)

The spotted lanternfly is a plant hopper native to China, India, and Vietnam. The Spotted Lanternfly is an invasive insect that was introduced to the US between 5 and 9 years ago to Pennsylvania and quickly spread throughout the south-eastern portion of that state. In 2018, live populations were found in Delaware and New Jersey. This insect is a voracious feeder on numerous species of plants, including some hardwoods, but of most concern is the impact seen on grapes and fruit trees. In the most heavily infested areas of PA, vineyards have seen a 90% reduction of harvestable grapes due to Spotted Lanternfly feeding.

Delaware has a small and growing wine grape industry and a well-established apple and peach industry. We have been coordinating with Pennsylvania as well as the USDA and other neighboring states to control the population of Spotted Lanternfly in our state with planned pesticide applications and host tree removal beginning in 2019.

PATHOGENS

Plum pox

Plum Pox is a viral disease of stone fruits first described in 1915 in Bulgaria on plums. It has since spread throughout the world, having been detected in the US in 1999. In 2006 detections were made in New York and Michigan. The Delaware Department of Agriculture has surveyed over 120 acres of orchards in Delaware susceptible to Plum Pox and have not found it in our state.

If plum pox were found, infected trees would be destroyed to prevent the spread of the disease in the orchard. Delaware's peach industry is worth approx. \$1,000,000 in production.

White-nose syndrome

White-Nose syndrome (WNS) is a disease causing mass die-offs of bats at hibernation sites in the U.S. and Canada (90—100 % at some locations). The US Fish and Wildlife Service estimates 5.6-6.7 million bats have died from WNS in just six years.

The disease is caused by a fungal pathogen called *Psuedogymnoascus destructans*, which erodes the bats skin tissue. Studies show that WNS causes bats to arouse during hibernation more frequently than normal; disrupting physiological processes. Scientists are researching this disease, how it affects different bat species, and how to contain or cure it.

PLANTS

Common reed (*Phragmites australis*)

Phragmites has been present in Delaware's marshes for a long time. In fact, research shows that this species has been a part of the wetland ecosystem of North America for over 11,000 years but, in the 1950s, *Phragmites* began to become a problem in North American wetlands. A

certain non-native type of *Phragmites* that came from Europe began to wreak havoc on Delaware's marshes.

Phragmites is a member of the grass family and spreads through an underground rhizome that can extend down as much as one meter and out more than 30 feet. This enables non-native *Phragmites* to spread more quickly than the native vegetation and form a complete monoculture. Because of this, *Phragmites* cannot be controlled by mowing or burning alone -- the rhizome allows new shoots to quickly re-establish so a combination of herbicide treatment and preferably followed by burning to remove the dead, above-ground, portion of the plant is necessary to allow native wetland plants to return to the site.

Invasive aquatic plants

The top three of present concern are: Hydrilla (*Hydrilla verticillata*), Creeping water primrose (*Ludwigia peploides*) and Parrot Feather (*Myriophyllum aquaticum*)

These plants can become very dense in a short period of time. At high densities, especially Hydrilla, can impede angling and boating and impact the ability of gamefish to forage and nest. They can also successfully outcompete native plant species. These plants are difficult to control using established control methods. A tremendous amount of staff time and resources can be expended in trying to control these species in our state ponds. In the past three years, more than \$600,000 has been spent to remove and control invasive aquatic plants in Delaware.

Delaware's Aquatic Invasive Species Management: Aquatic invasive species are extremely difficult to eradicate or even to control once they become established, thus prevention is key. Most efforts are directed towards this end of the spectrum and include outreach/education during interactions with the public in the field, by posting signs, making information available on the Division's webpage, disseminating information at public events, via press releases, and through the Delaware Invasive Species Council meetings and webpage. Targeted removals are conducted on a case by case basis but this requires a huge amount of staff time and resources and is not always effective or lasting.

Japanese stilt grass (*Microstegium vimineum*)

Japanese stilt grass is an annual grass native to Asia and was introduced to North America in the early 1900's. The species was likely an accidental introduction; possibly being used as packing material. Japanese stilt grass was first reported in Delaware in 1942, from New Castle Co. and has since spread to the entire state. This invasive grass is shade tolerant and is capable of completely dominating the forest floor of moist woodlands and floodplains. The species is also found in non-tidal marshes, ditches and along hiking trails.

Lesser celandine (*Ficaria verna*, synonym = *Ranunculus ficaria*)

Lesser celandine is a perennial herbaceous plant that is native to Europe. The species was first introduced to the United States as an ornamental plant, but now invades moist woods and forested floodplains. Lesser celandine is considered a spring ephemeral, blooming in late March and early April. The species has an extremely aggressive growth habit and forms dense carpets that excludes all other native vegetation. In addition to seed, the plant reproduces vegetatively and spreads by underground tubers. The species is known from every Piedmont stream valley in New Castle Co. and is spreading to the floodplains of rivers and streams in the Coastal Plain province farther south.

Norway maple (*Acer platanoides*)

The Norway maple is a deciduous tree native to Europe, reaching a height of 60 to 70 feet. It was brought to America in the mid-1700's to serve as a shade tree. It was first reported as an introduction to natural areas in Delaware in 1897 from the Piedmont province of New Castle County. This tree is now known from all three counties of the state, where it invades disturbed forests and edges. The species can out-compete native tree species and has the ability to dominate the forest canopy to the detriment of native wildlife species that dwell in the forest interior.

Winged euonymus (*Euonymus alatus*)

The winged euonymus is a deciduous shrub native to Asia. Introduced to America in the mid-19th Century, it is a popular plant in the nursery trade due to its brilliant red foliage in the fall. The species has escaped from cultivation and is now widely established in natural areas throughout the Piedmont province of New Castle County and is spreading farther south in the state. The winged euonymus is shade tolerant and forms dense thickets in moist woods, forested slopes and floodplains. The species is spread by birds who consume their fruits and disperse seeds to natural areas.

WILDLIFE

Blue catfish (*Ictalurus furcatus*)

Blue Catfish originated in Mississippi, Missouri and Ohio River drainages. Over the years, this species has been introduced in 20 states to provide recreational angling. Virginia stocked them in 1970s and 1980s and they have since spread in the region. The blue catfish was first documented in the Delaware River in 2013 and in Nanticoke River drainage 2013. The abundance of this species in the Nanticoke River system appears to have grown rapidly in the past few years.

The biggest threat of this non-native species is the ability of populations to grow rapidly and expand. They are voracious eaters and forage on a variety of food items – they can alter the food web via direct predation on important fish species and indirectly by competition for resources. They can reach very large sizes (100+lbs) in a relatively short period of time and have few natural predators once they attain these sizes.

Flathead catfish (*Pylodictis olivaris*)

The flathead catfish originated in the rivers and lakes in the lower Great Lakes and Mississippi River watersheds to the Gulf States; Introduced into the James River in Virginia in the late 1960s to provide recreational angling and have since spread within the region. In areas where this species has been introduced they have severely reduced the abundance and diversity of native fish species. Although they feed primarily on invertebrates such as worms, insects, and crustaceans when they are young, the adult diet is primarily piscivorous (i.e. consists of live fish). There is a direct effect from predation but also an indirect effect of competition with other species that depend on native fish species for prey or to fulfill other ecological functions. They grow large (with few predators) quickly and their populations have the potential to expand rather rapidly once established (one nest can contain up to 100,000 eggs).

In Delaware, the first known occurrence of this species came from an angler that reported catching one in 2010 from the Brandywine River. Thus far confirmed reports are from the

Christina River system only. This species is abundant in the DE River and Chesapeake Bay drainage in surrounding states, so may be just a matter of time before they become more abundant in DE.

Lionfish (*Pterois volitans* L.)

The lionfish is native to the South Pacific and Indian Oceans and inhabits offshore reefs, turbid inshore areas, as well as lagoons, and harbors. While lionfish have not been found in Delaware, primarily because the water temperature within the mid-Atlantic region is too cold for this species to survive, things like climate change could make conditions in our portion of the country suitable for this problematic species in the future. Lionfish are the only non-native marine fish that is known to not only survive, but reproduce along the Eastern seaboard, the Gulf of Mexico, and the Caribbean. Lionfish are very aggressive feeders and have the potential to negatively impact native reef communities and the commercial and sportfish industry due to the decline in certain species that we like to eat such as various species of snapper and grouper.

Northern snakehead (*Chana argus*)

The northern snakehead, originally from China and Russia, was brought to the US as part of the food fish market. Illegal stockings and escape from fish farms are a main source of spread. Occurrence in DE: First confirmed in the Nanticoke River watershed (established downstream so migration to DE was a matter of time) and Becks Pond in 2011 (illegal stocking). Have since spread throughout tributaries of the Nanticoke River drainage as well as tributaries of the Delaware River (Christina – White Clay, Brandywine, Red Lion Creek, Dragon Run). Also occur in numerous impoundments (private and public) in Northern DE – some illegally stocked, others through natural spread.

This species has the ability to survive in poor water quality situations and can spread throughout a stream system as long as there are no impediments (dams). There is concern that they can outcompete native species, especially those that share similar spawning habitat and foraging activities such as Largemouth Bass. More research is needed however to confirm an ecological impact. The introduction of this species into habitat that supports a rare fish species, such as state endangered Blackbanded Sunfish, may be especially damaging.

Nutria (*Myocastor coypus*)

Nutria are invasive, semi-aquatic, South American rodents first released into Dorchester County, Maryland in 1943. Nutria did not evolve in our wetland ecosystems; therefore, there are few predators or natural conditions that control their population. Since their release, nutria have destroyed thousands of acres of wetlands through their destructive feeding habits. In the Chesapeake Bay, nutria are primarily limited to the Delmarva Peninsula, where they have been found in six Maryland counties and portions of Delaware and Virginia.

Swamp red crayfish (*Procambarus clarkia*)

The swamp red crayfish is native to Northern Mexico, southern and southeast U.S. Believed to have been introduced via anglers using live bait, release of classroom pets, escaped from aquaculture facilities, and from the live food fish market.

The swamp red crayfish was first reported in 2011 but have since become pretty widespread in private ponds, stormwater management basins, and public waterways. This species outcompetes native crayfish species and is a vector for pathogens that can affect these native species.