

## Highlights:

- Muscovy Ducks and the Migratory Bird Treaty Act
- Invasive tadpoles' salinity tolerance
- Horse dung—a vector for invasive species in parks?
- Sparrow immune system facilitates invasion
- Cost of constrictors

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## Focal Species: Muscovy Duck

### Scientific name:

*Cairina moscata*

### Size:

Males 10-15 lbs.; females slightly smaller

### Native range:

South America, Central America, Mexico, Southern Texas

### Notes:

Recently expanded native range into Texas naturally



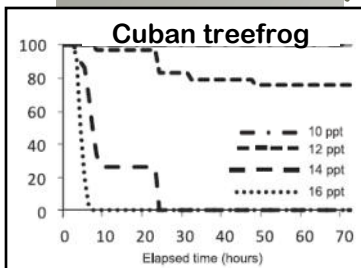
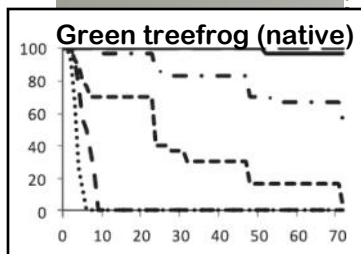
Muscovy ducks were introduced into the U.S. intentionally as an ornamental species to enhance the aesthetic of urban parks; the first records of this species in Florida date to the mid-1960s. These large ducks are also popular in farming--both for their eggs and their meat--and have often escaped from farms to establish feral populations. These feral Muscovy ducks have the potential to impact native ecosystems by interbreeding with native ducks and spreading disease to native birds. In urban areas, these large ducks can increase their populations rapidly and become aggressive if fed. They produce large amounts of unsightly feces on docks, boat ramps, and seawalls that can contaminate water, increase nutrient loading, and potentially spread disease to humans,

Muscovy ducks naturally expanded their range from Mexico into southern Texas and are now considered native in the U.S.--as a result, in 2010, this invasive species became protected under the Migratory Bird Treaty Act. However, these protections relate only to areas where the birds are native and release of this invasive species is still prohibited under Federal Control Order 50 CFR 21 and, in Florida, by Statute 379.231 relating to regulation of non-native species. Furthermore, Federal Control Order 50 CFR 21 issued by the USFWS allows landowners, tenants, wildlife management agencies, and others to capture and humanely euthanize Muscovy ducks without a permit if they have no identifiable owner and are found on your property. Muscovy ducks can be baited and trapped or removed by nuisance wildlife trappers (see Resources) but cannot be relocated. When trapping is not an option, eggs can be removed from the nest, shaken vigorously or dipped in vegetable oil, and replaced in the nest to reduce reproductive success. Problems with nuisance Muscovy ducks can also be reported to the FWC Waterfowl Management Program at (850) 488-5878. [Learn More...](#)



## Science: Tadpole Salinity Tolerance

Wetland habitats in coastal habitats are subject to fluctuations in salinity levels, which can influence species richness of amphibian communities. Variation in salinity level fluctuations is related not only to proximity to the coast but also variation in annual precipitation, which in turn may be influenced by climate change. Overwash from storms, the frequency of which may also be influenced by climate change, can also lead to extreme fluctuations in wetland salinity. In a recent study, researchers at the U.S. Geological Survey evaluated the salinity tolerance of tadpoles of six native frogs and one invasive species, the Cuban treefrog. Eastern narrow-mouthed toad tadpoles had extremely low salinity tolerance, likely due to a fundamental difference in feeding mode. Tadpoles of the other five native frogs--green and squirrel treefrogs, bullfrogs, leopard frogs, and southern toads were fairly tolerant of salinities up to 10 ppt but did not survive past 24 hours when salinity reached or exceeded 12 ppt. However, invasive Cuban treefrogs experienced ~80% survival at 12 ppt and were able to survive 14ppt for up to 24 hours. This difference in salinity tolerance could give tadpoles of the invasive species a competitive advantage in coastal areas. Cuban treefrogs may already be found in mangroves and brackish marshes of Florida, where it is believed that the salinity tolerance of their tadpoles may enable them to exploit habitats inhospitable to other species. As climate change increases both the geographical area conducive for Cuban treefrog invasion and the salinity variability of wetland habitats, the range of this invasive species will likely continue to expand. [Learn More...](#)



Percent tadpole survival over time. Figures from Brown & Walls 2013



Cuban treefrog tadpole (USGS photo)

## Science: The Dung Vector

Horse riding is permitted in many protected natural areas in the US, despite known negative impacts that include damage to riparian areas, trampling of native vegetation, and nutrient addition. Numerous studies have shown that horse dung may serve as a vector for long-distance dispersal of invasive plant seeds into protected areas. In order to answer several key questions about the potential for this vector to spread invasive species, Australian researchers reviewed 15 studies of seed germination from around the globe. Their review found that seeds from 249 species of plants have been identified germinating in horse dung, and 47% of these species were considered invasive. Several studies found that horse dung contains large numbers of viable seeds; one study estimated that a single horse excretes 700 viable seeds per day. Small, light seeds with hard seed coats were more likely to remain viable and germinate and dicots survived longer post-germination. Although most seeds were dispersed within five days of ingestion, viable seed could still be present in the dung as long as 70 days after ingestion. Trampling and soil disturbance in the area helped seeds to germinate although favorable conditions were required for long-term survival and long-term outcomes for germinated seedlings varied greatly among studies. Similarly, the risks posed by seeds germinating from horse dung varied greatly between study areas. These researchers suggested that precautions intended to reduce risks, such as feeding horse feed free from seeds for 48 hours before entry into protected areas and cleaning hooves and tack might reduce the risk of seed introduction. However, enforcement of these precautions would be difficult at best. Instead, limiting equestrian access in sensitive areas and monitoring equestrian trails for invasive plants may provide better options for reducing the potential for impacts resulting from this invasive species vector.



[Learn More...](#)

# House Sparrow Immunity

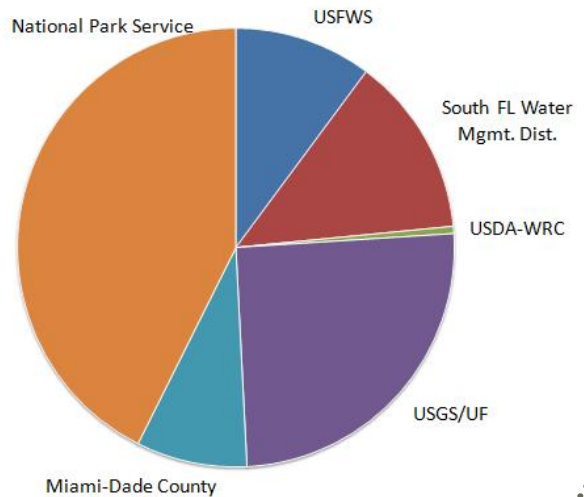
European house sparrows have been introduced around the world and thrive in many human-populated areas. Invasive house sparrows threaten many native birds such as bluebirds, martins, and woodpeckers, which the house sparrows evict from their nests. House sparrows are common scavengers in urban areas, where their nests on urban structures may pose a fire hazard. Early in their invasion of the U.S., these highly omnivorous birds were considered a major agricultural pest, but house sparrow numbers are currently declining in the U.S. In other areas of the world, house sparrows are considered a major threat and new invasions are thriving and expanding their ranges. Recently, researchers at the University of South Florida compared immune responses of house sparrows in Mombasa, the initial introduction site of a population in Kenya, to the immune response of house sparrows at the invasion front. They found key differences in the expression of certain immune factors, which suggested that the immune systems of house sparrows at the invasion front are able to respond to potentially harmful microbes more effectively, thus increasing survival of birds in newly-invaded areas. Similarly, other highly successful invasive species have been found to have adaptations – for example, behavioral or morphological – that facilitated rapid invasion by enhancing the survival or dispersal of individuals at the invasion front. [Learn More...](#)



# Cost of Constrictors

As large constrictors continue to persist in South Florida and eradication seems unlikely, the expected annual cost of managing this invasive species is likely to remain high. In 2012, the USFWS published a brief report on the cost of constrictor snakes that estimated the annual cost at over \$700K and provided a breakdown of the ~\$6M spent by various agencies from 2005-2012 (see graph of relative spending). The National Park Service spends over \$300K/year on various projects. The USGS and UF together spent a total of ~\$1.5M on research, radiotelemetry, and trap design and testing, and the National Park Service spent ~\$600K to design and deploy python traps and educate the public. Local state and county agencies also allocated substantial funding to constrictor related issues. See Resources for link to full report.

Proportional Expenditure, by Agency, for Constrictor Issues (2005-2012)

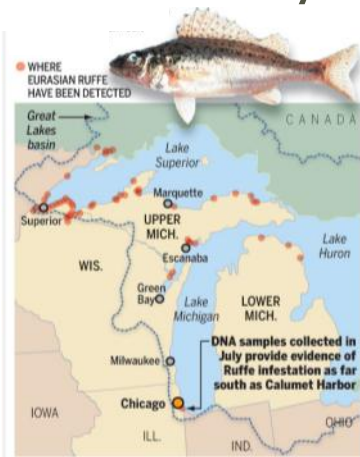


# Noteworthy: Starling Elimination

For the US Department of Agriculture Wildlife Services, managing invasive European starlings is high priority. These birds can spread many serious diseases to native birds, livestock, wildlife, and humans, including E. coli, Salmonella, Avian Tuberculosis, Johne's disease (a severe bacterial infection in dairy cattle and other ruminants), and histoplasmosis (a fungal, pneumonia-like disease). Although Wildlife Services kills approximately 100,000 invasive starlings each year by treating dairies and feedlots with avicide, these numbers pale in comparison to the ~200 million of these birds that range from Alaska to Mexico, wreaking havoc on agricultural operations, causing damages with an estimated cost of \$800 million per year.



## Noteworthy: Eurasian Ruffe Range Expands



Source: Wisconsin Department of Natural Resources; Nature Conservancy | Journal Sentinel

Although other non-native fishes such as Asian carp, lampreys, and round gobies, may pose a greater threat to the Great Lakes, the spread of the Eurasian ruffe into lower Lake Michigan is raising concerns among scientists. The ruffe is already fairly widespread in Lake Superior and has been found in Lake Huron but has spread relatively slowly and has had no documented negative impacts on native fisheries. However, this perch species has been known to impact native species in areas of Europe where it has been introduced and is considered a prolific breeder and aggressive feeder. In the shallower, warmer waters of Lake Michigan, the ruffe invasion could threaten the yellow perch recreational fishery by competing with the more desirable native species and reducing their population density.

The Invader Updater is a quarterly newsletter focused primarily on providing information on invasive vertebrate animals in Florida and the southeastern U.S. and was first published in Winter 2009. This newsletter is produced by:

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## Related Resources

- ◆ [Nuisance Muscovy Ducks](#) - FWC
- ◆ [FWC Nuisance Wildlife Trappers by County](#)
- ◆ [Florida's Introduced Birds: Muscovy Duck \(\*Cairina moschata\*\)](#) - UF/IFAS EDIS
- ◆ [Muscovy duck and the Migratory Bird Treaty Act: Questions and Answers \(PDF\)](#) - USFWS
- ◆ [Noxious weeds germinating in horse dung the world over](#) – Nature World News
- ◆ [Invasive Sparrows immune cells sharpen as they spread](#) – Science Daily
- ◆ [The economic cost of constrictor snakes](#) – USFWS
- ◆ [U.S. Fish and Wildlife Service trying to control \[sic\] invasive starlings](#) – Idaho State Journal
- ◆ [DNA of Eurasian ruffe found for first time in southern Lake Michigan](#) – Milwaukee Journal-Sentinel
- ◆ [Introduced Species Summary Project: Ruffe \(\*Gymnocephalus cernuus\*\)](#) - Columbia University
- ◆ [FWC Non-native Amnesty Day Events](#)