

The History, Threats, and Containment of Invasive Northern Snakehead in New York City



The City College
of New York

Joanna Chen, Anthony Mathai, Escarlin Mercado, Andrii Shypachov
The City College of New York, New York, NY, United States

MACAULAY
HONORS COLLEGE

INTRODUCTION

The calm waters of New York City's ponds are home to a diverse array of aquatic life, but amidst all this is a recent intruder, an aggressive and carnivorous predator – the Northern Snakehead (*Channa argus*).¹

While currently confined to a few small ponds in Queens, the invasive species has left a profound mark on various regions, especially eastern Virginia, Washington, D.C., Maryland, Delaware, southern New Jersey, and pockets of Arkansas.

The research will examine the steps that led to its infiltration and establishment in American waters, study its impact on New York City's water bodies, and formulate strategies to mitigate the risks and prevent further encroachment within the city's limits.²



Photo of Northern Snakehead. Picture from https://nyis.info/invasive_species/northern-snakehead/

HISTORY/GENERAL INFORMATION

Northern Snakeheads typically live in freshwater streams, rivers, wetlands or ponds. Since they're able to survive the cold winter as well as low oxygen environment, they become more of a threat as invasive species. They can also breathe air and survive out of water for days as long as they don't dry out.³

During the juvenile stage, Northern Snakeheads tend to eat smaller prey, but adults are capable of eating fish "that are up to 33% of their own body length, such as loach, bream and carp."⁴

Each year the Northern Snakehead may spawn up to five times, releasing roughly 1 500 eggs each time that hatch within three days. Northern Snakeheads are fiercely protective of their young, sticking close to the eggs which increases the chance of survival and therefore the number of these fish.⁴

It is assumed that the Northern Snakehead entered the United States through aquarium dumping. It also may have been intentionally released into waterways to act as a local food source for fisherman.³

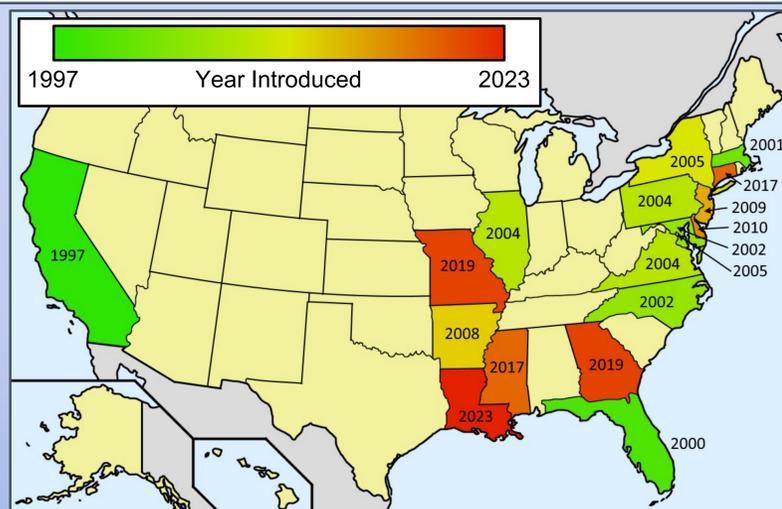


Figure 1: Spread of Northern Snakehead in the U.S. by Year⁵

IMPACT ON WATER BODIES

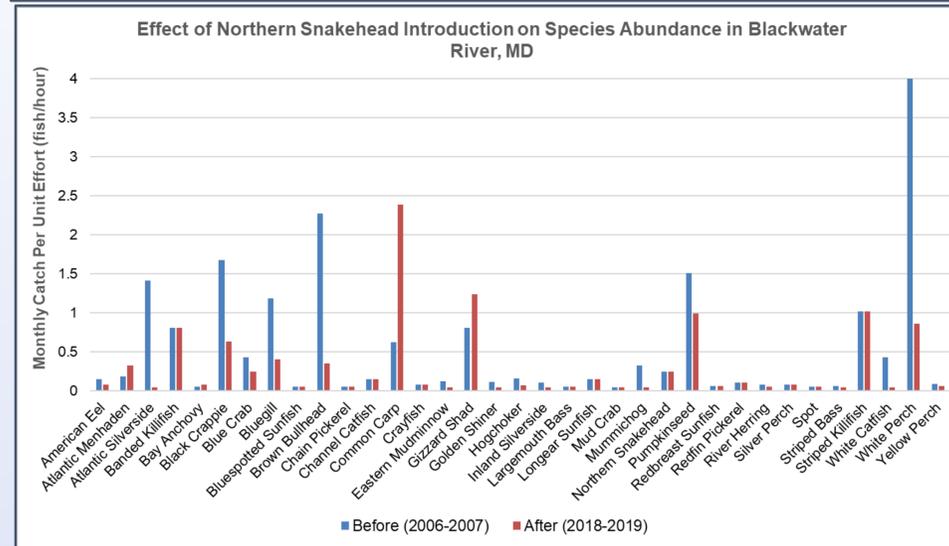


Figure 2: Monthly CPUE of various fish species in Blackwater River, MD, before and after establishment of Northern Snakehead⁶

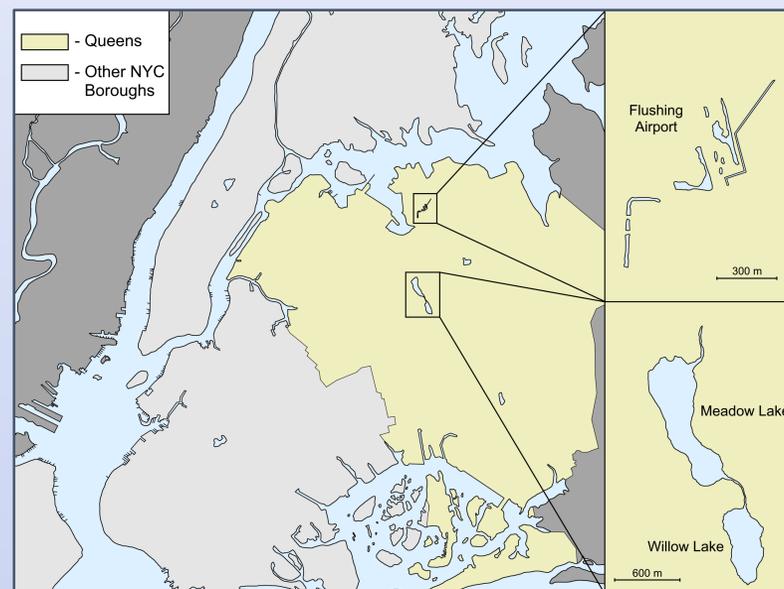


Figure 3: Water Bodies in NYC with Recorded Northern Snakehead presence

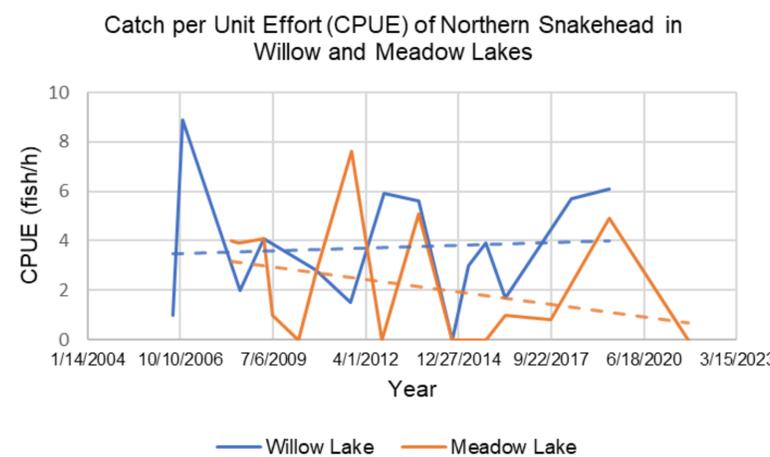


Figure 4: CPUE of Northern Snakehead in Meadow and Willow Lakes showing no consistent growth rate in the abundance of the species^{7,8,9}

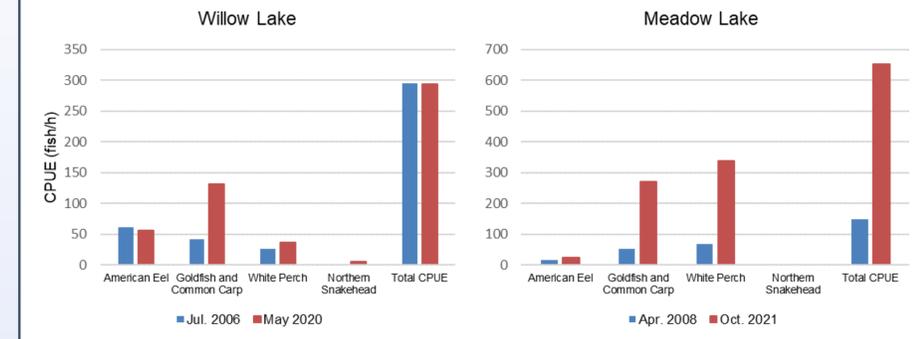


Figure 5: CPUE of various fish species in Meadow and Willow Lakes indicating absence of a negative effect of the Northern Snakehead on the lakes' biodiversity^{8,9,10}

CONCLUSIONS

We found that currently the Northern Snakehead does not pose a significant danger to NYC's water ecosystem. Unlike in other regions, population of snakehead was not able to grow to levels harmful to local biodiversity of Meadow and Willow Lakes. This could be due to several reasons, including higher salinity and pH levels as well as competition with local species, especially American eel.⁷ However, other water bodies of the city, such as large Central Park Reservoir, do not have such deterrents, so it is possible that introduction of Northern Snakehead can lead to consequences to those observed in Blackwater River, MD.

PREVENTION AND CONTROL

To curb the spread of snakehead in New York City, it is crucial to enhance regulations of the import and sale of exotic species, regularly inspect water bodies, increase public awareness about the dangers of releasing non-native species. Collaborative initiatives with environmental agencies, communities, and neighboring regions can facilitate the implementation of effective control measures.¹¹

Also, it is possible to use traps, nets, electric fishing, and pesticides like rotenone—which are substances intended to control pests. However, it's imperative to apply caution in their use, considering the potential damage to other species.

What should you do if you catch Northern Snakehead? NYS Department of Environmental Conservation's recommendations:

- Do not release it.
- Kill it promptly and freeze it (bear in mind that this fish variety can endure outside of water and survive).
- Email the photos and the location of the catch to isinfo@dec.ny.gov.

REFERENCES

1. Stinson, Hannah. 2018. 101-102stinsonreviewarticle. Vol. 14.
2. Northern snakehead. Northern Snakehead - NYS Dept. of Environmental Conservation. (n.d.). www.dec.ny.gov.
3. New York Invasive Species (IS) information. (2019, July 2). *Northern Snakehead*. https://nyis.info/invasive_species/northern-snakehead/
4. Invasive Northern Snakehead - NYS Dept. of Environmental Conservation. Northern snakehead fish. (2021, July 9). Smithsonian's National Zoo. <https://nationalzoo.si.edu/animals/northern-snakehead-fish>
5. USGS. (2023, Nov 17). NAS - Nonindigenous Aquatic Species. <https://nas.er.usgs.gov/queries/factsheet.aspx?speciesid=2265>
6. Joshua J. N., Joseph W. L. (2019). Comparison of fish community within the Blackwater River watershed before and after establishment of Northern Snakehead *Channa argus*. *Maryland Department of Natural Resources*. https://dnr.maryland.gov/fisheries/Documents/FINAL_Blackwater%20Fish%20Community%20Comparison.pdf
7. Melissa K. C., James A. M. (2016). Northern Snakeheads in New York City. *NORTHEASTERN NATURALIST*, 23, 11-24. https://www.dec.ny.gov/docs/fish_marine_pdf/snakeheadsnyc.pdf
8. Melissa K. C. (2020, May 14). Willow Lake (Survey #: 219003). NYS Dept. of Environmental Conservation. https://www.dec.ny.gov/docs/fish_marine_pdf/tb219003.pdf
9. Melissa K. C. (2022, Feb. 16). Meadow Lake Fisheries Survey (#221009). NYS Dept. of Environmental Conservation. https://www.dec.ny.gov/docs/fish_marine_pdf/tb2meadow.pdf
10. Alexander M. B., Melissa K. C., James A. M. (2010). Northern Snakeheads in Two New York City Lakes over Four Years. NYS Dept. of Environmental Conservation. https://www.dec.ny.gov/docs/fish_marine_pdf/meadowwillrep.pdf
11. WNY PRISM. (2023, January 12). *Northern snakehead*. https://www.wnyprism.org/invasive_species/northern-snakehead/