

Defining an invasive – are blue catfish invasive?

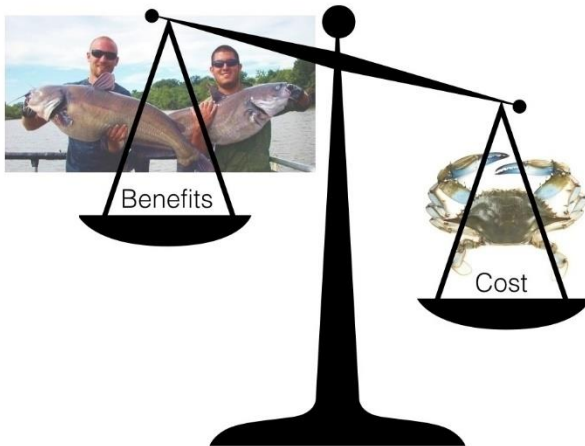
Next to habitat degradation, invasive species are the greatest threat to global biodiversity¹, yet definitions of “invasive species” vary broadly². Many terms are used to describe organisms that have been transplanted into a new environment. These species are commonly referred to as “non-native”, “non-indigenous”, or “introduced”, but this does not mean the species is invasive.

So how do we define an “invasive” species? A few definitions are widely accepted:

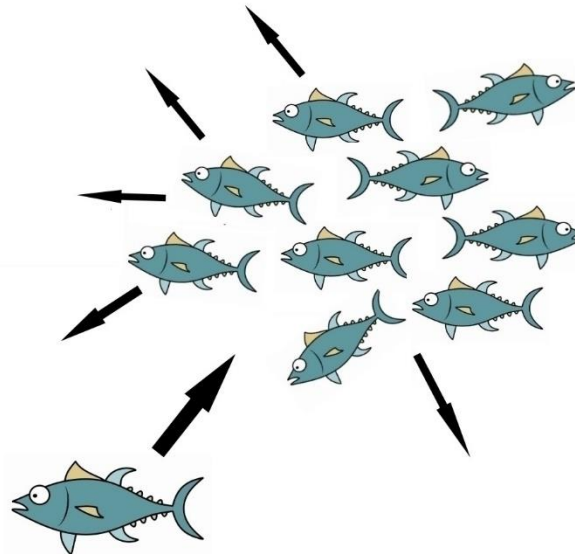


Defintion 1: The federal government defines an invasive species as a species that results in harm. Be it harm to the economy, the environment, or to human health.³

Moreover, for a species to be invasive, its negative impacts must outweigh any benefit that it may provide.³



Defintion 2: Many ecologists have a different definition. For a species to be invasive, it must be self-sustaining (reproducing) and expanding geographically beyond its initial point of introduction.⁴



The vast majority of sportfish in Virginia are non-native species. Largemouth bass, smallmouth bass, rainbow trout, brown trout, musky, channel catfish, have been widely introduced throughout the state.⁵

Without non-native fish introductions, the freshwater portions of our tidal rivers would be dominated by longnose gar and bowfin and offer few opportunities to anglers.



So where do blue catfish fit in all of this? Are they invasive?

Are blue catfish invasive? If we adopt the definition accepted by many ecologists, they definitely are. Blue catfish are incredibly abundant within the Chesapeake Bay and their population has expanded to occupy every major tributary.

It becomes more complicated if we adopt the definition of the National Invasive Species Council. Here, for a species to be invasive, its negative impacts must outweigh any benefit that the species may provide.



Blue catfish support an incredible trophy fishery in the James River, which supports numerous full time fishing guides, angling clubs, and tackle shops. People travel from across the U.S. to experience this fishery. Moreover, blue catfish support a growing commercial fishery, with landings increasing steadily since the early 2000s.

My research has demonstrated that much of the "demonization" of this species has been based on conjecture.⁶

While not yet quantified, the value of the blue catfish fishery may outweigh any negative impacts caused by this species. If this is the case, they would not be an invasive species according to the federal definition.

Where do we go from here?

There are still a few things we need to know before we can classify blue catfish as invasive, at least under the federal definition.

First, we need to know the value of the blue catfish fishery. We already have commercial harvest landings data, so researchers would need to assess the value of the recreational fishery, which would be more complicated.

We also need credible estimates of blue catfish population size. We can then integrate diet and consumption rate information (from my study) with population size estimates to quantify how much damage they are doing to native species such as blue crabs. We can then compare costs to benefits. Remember, under the federal definition, a species is invasive if damages exceed benefits.



References

¹Light, T., and M. P. Marchetti 2007. Distinguishing between invasions and habitat changes as drivers of diversity loss among California's freshwater fishes. *Conservation Biology* 21(2): 434-446.

²Moyle, P. B., and T. Light. 1996. Biological invasions of fresh water: empirical rules and assembly theory. *Biological Conservation* 78(1):149-161.

³(ISAC) Invasive Species Advisory Committee. 2006. Invasive species definition clarification and guidance white paper. National Invasive Species Council. US Department of Agriculture, National Agricultural Library. Washington, DC. Available at <http://www.invasivespeciesinfo.gov/docs/council/isacdef.pdf>. (Oct 2016).

⁴Lockwood, J. L., Hoopes, M. F., and M. P. Marchetti. 2013. *Invasion Ecology*. John Wiley & Sons, Hoboken, New Jersey.

⁵Jenkins, R. E., and N. M. Burkhead. 1994. *Freshwater Fishes of Virginia*. American Fisheries Society, Bethesda, Maryland.

⁶Schmitt, J.D., Moran, Z., Emmel, J.A., Bunch, A., Hallerman, E.M., and D.J. Orth. 2017. Predation and prey selectivity by non-native catfishes on migrating alosines in an Atlantic slope estuary. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science*. *In Press*.