

Sustainable Fisheries Goal Implementation Team Executive Committee
ADOPTION STATEMENT
Invasive Catfish Policy

Language in question

Blue catfish (*Ictalurus furcatus*) and flathead catfish (*Pylodictis olivaris*) are indigenous to the Mississippi River drainage. They are two of many non-native freshwater species introduced to the Chesapeake Bay watershed, and are considered invasive species within the Bay ecosystem. Both species are long lived and fast growing. They exhibit an opportunistic generalist feeding strategy, a strategy which includes shifts to higher trophic levels as individuals mature, the diet of flathead catfish becoming predominantly fish-based at an early age (Fabrizio *et al.* 2011).

Aided by unauthorized introductions (Fabrizio *et al.* 2011), range expansion has occurred for both species in the period following introduction. In the case of blue catfish, range expansion has been dramatic, and the species could be posing a threat to native species in all major Chesapeake Bay river systems in Virginia and Maryland (Fabrizio *et al.* 2011). Habitat in eutrophic large river systems (a majority of Chesapeake tributaries) is extremely conducive to expansion of populations of blue catfish, and the species has become extremely abundant in several highly productive (i.e. eutrophic) Bay tributaries, with dramatic temporal increases in blue catfish abundance documented in the James and Rappahannock rivers (Greenlee and Lim, 2011). In addition to continued range expansion, these nonnative catfish species have the potential to alter lower trophic levels through a hypothesized top-down cascade (McPeck 1998; MacAvoy *et al.* 2008).

Invasive species exhibit certain biological characteristics believed to enhance the likelihood of establishment in new environments. In blue catfish and flathead catfish these characteristics include: a diverse diet, adult trophic status as apex predators, long life span, large body size, high salinity tolerance, and parental care of young (Table 1; Morris and Whitfield 2009; Fabrizio *et al.* 2011). Flathead and blue catfish are likely causing detrimental impacts throughout their expanding range potentially creating unbalanced ecosystems. The predation pressure these species exert has the potential to negatively impact other resources, with potential implications for ongoing efforts to restore native species (i.e. shad and river herring), including species that support valuable recreational and commercial fisheries in the Chesapeake Bay (Fabrizio *et al.* 2011), and which serve important ecological functions.

The Sustainable Fisheries Goal Implementation Team Executive Committee has concluded that the potential risk posed by blue catfish and flathead catfish on native species warrants action to examine potential measures to reduce densities and limit range expansion, and to evaluate possible negative ecological impacts. The Sustainable Fisheries Goal Implementation Team Executive Committee agrees to work together to:

- Include blue catfish and flathead catfish in public awareness campaigns targeting invasive species, including efforts to prevent further introductions;
- Improve scientific understanding of blue catfish and flathead catfish biology and population dynamics;
- Develop models that will aid in better understanding the potential impacts of non-native species on the fish community;
- Develop ~~and implement~~ **and implement/evaluate** a set of management measures (e.g. increased harvest and/or nutrient reduction) aimed at controlling populations and mitigating adverse effects of blue and flathead catfish while recognizing that these two catfish species currently support fisheries with economic and recreational value;
- Identify high-risk/high-value opportunities for containment and/or mitigation; assessing risk of expansion and ecological resource valuation by developing an integrated online decision support tool.

January 23rd, 2012

Sustainable Fisheries Goal Implementation Team Executive Committee

FOR NOAA



FOR MD-DNR



FOR DC-DDOE



FOR PRFC



FOR VMRC



FOR ASMFC



FOR VDGIF



Proposed Wording Changes:

1. *"Flathead and blue catfish have the potential to negatively and significantly reduce growth, survival, and/or abundance of native species, which would further affect the health of the Bay ecosystem."*
2. *"Flathead and blue catfish are likely causing impacts throughout their expanding range; of particular concern is the potential for significant negative impacts on native species, which would further affect the health of the Bay ecosystem."*
3. *"By disrupting trophic structure of native species, invasive catfish have the potential to exert measurable ecological harm to the ecosystem".*

Table 1. Predictors of invasiveness for blue and flathead catfishes (adapted from Morris and Whitfield 2009). Propagule pressure refers to the density of individuals introduced, the number of introduction events, and the frequency of introductions. In addition to the predictors shown in the table, short distance to native source, young age at maturity, large egg diameter, and long reproductive season have been identified as additional predictors of invasiveness, however, none of these apply to the two catfishes.

Predictor	Blue catfish	Flathead catfish	Reference
High propagule pressure	?	?	Marchetti <i>et al.</i> 2004a Marchetti <i>et al.</i> 2004b Colautti 2005 Jeschke & Strayer 2005 Jeschke & Strayer 2006
Prior invader	X	X	Kolar & Lodge 2002 Marchetti <i>et al.</i> 2004a Marchetti <i>et al.</i> 2004b Ribeiro <i>et al.</i> 2008
Large native range	X	X	Marchetti <i>et al.</i> 2004a Marchetti <i>et al.</i> 2004b
Environmental tolerance	X	X	Kolar & Lodge 2002 Marchetti <i>et al.</i> 2004a Marchetti <i>et al.</i> 2004b Vila-Gispert <i>et al.</i> 2005
Long life span	X	X	Marchetti <i>et al.</i> 2004a
Large body size	X	X	Marchetti <i>et al.</i> 2004b Colautti 2005 Duggan <i>et al.</i> 2006 Ribeiro <i>et al.</i> 2008
High adult trophic status	X	X	Marchetti <i>et al.</i> 2004b
Broad diet	X		Kolar & Lodge 2002 Ruesink 2005
Fast growth		X	Kolar & Lodge 2002
High fecundity	X		Jeschke & Strayer 2005 Jeschke & Strayer 2006 Vila-Gispert <i>et al.</i> 2005
Parental care	X	X	Marchetti <i>et al.</i> 2004a Marchetti <i>et al.</i> 2004b Jeschke & Strayer 2005 Jeschke & Strayer 2006

Literature Cited

- Fabrizio, M., G. Garman, B. Greenlee, M. Groves, and N. Butowski. 2011. Are Blue and Flathead Catfishes Invasive in the Chesapeake Bay Watershed? White paper presented to the Sustainable Fisheries Goal Implementation Team, July 2011.
- Greenlee, R. S., and C. Lim. 2011. Searching for Equilibrium: Population Parameters and Variable Recruitment in Introduced Blue Catfish Populations in Four Virginia Tidal River Systems. 2011. *In Press* Ecological Role of Blue Catfish in Chesapeake Bay Communities and Implications for Management. Virginia Institute of Marine Science, College of William and Mary. American Fisheries Society.
- MacAvoy, S., G. Garman, and S. Macko. 2009. Anadromous Fish as Marine Nutrient Vectors. *Fish.Bull.*107:165-174.
- McPeck, M. A. 1998. The consequences of changing the top predator in a food web: a comparative experimental approach. *Ecological Monographs* 68:1-23.
- Morris, J., and P. Whitefield. 2009. Biology, Ecology, Control and Management of the Invasive Indo-Pacific Lionfish: an updated integrated assessment for alien fish in North America. *Science* 298:1233-1235.
- Schloesser, R., M. Fabrizio, R. Latour, G. Garman, B. Greenlee, M. Groves, M. and J. Gartland. 2011. *In Press* Ecological Role of Blue Catfish in Chesapeake Bay Communities and Implications for Management. Virginia Institute of Marine Science, College of William and Mary. American Fisheries Society.