



Minnesota Department of Natural Resources (DNR) Classification Summary for Invasive Species

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Classification Screening for Nile perch, *Lates niloticus*

Contents

Classification Screening for Nile perch.....	1
Introduction.....	1
Species Summary.....	2
Eligibility Screening.....	3
Classification Screening.....	3
Summary.....	10
Appendix.....	11
References Cited.....	11
Additional References.....	13
RAMP References Cited.....	14

Introduction

This document is a guide to the Minnesota DNR’s authority under *Minnesota Statutes*, chapter 84D, to designate invasive species as prohibited or regulated invasive species. The conclusions and recommendations in this document are for information purposes only and do not require the DNR or any other entity to take a specific action.

More information about classifications of invasive species can be found on the [DNR website](http://www.dnr.state.mn.us/invasives/laws.html) (<http://www.dnr.state.mn.us/invasives/laws.html>) and in *Minnesota Statutes*, [chapter 84D](#)

(<https://www.revisor.mn.gov/statutes/?id=84D>). Prohibited, regulated, and unregulated species are listed in Minnesota Rules, [chapter 6216](https://www.revisor.mn.gov/rules/?id=6216) (<https://www.revisor.mn.gov/rules/?id=6216>).

How to fill out this classification screening

For more detailed guidance on completing this document, see the DNR's "Guidance for Invasive Species Classification Summaries". The following is a brief guide:

- Fill out the Species Summary section with the species name and a brief description of the species and its current regulatory status in Minnesota.
- Answer the questions in the Eligibility Screening section to determine whether the species is eligible for regulation under *Minnesota Statutes*, chapter 84D.
- If the species is eligible for regulation under *Minnesota Statutes*, chapter 84D, continue to answer the questions in the Classification Screening section and characterize the certainty of the answer for each question.
- At the end of the classification screening questions, summarize the most important points from the answers and judge the overall certainty of the screening.
- Finally, you should make a recommendation for classifying the species, based on the findings of the classification screening.
- Update the table of contents when the document is completed.

Species Summary

Common name: Nile perch

Scientific name: *Lates niloticus*

Brief description: Nile perch is a predatory fish species native to Africa. It can grow up to two meters (six feet) and weigh up to 200 kg (400 lbs). It is a generalist predator that feeds primarily on fish, as well as crustaceans, insects, zooplankton. Nile perch reach maturity after one to two years and are highly reproductive in warm and oxygen-rich bodies of water. They are cited to reproduce throughout the year in warm tropical areas in lakes, rivers, and dams (Hopson 1972; Ogutu-Ohwayo 1988), preferring shallow nearshore waters for breeding (Yongo *et al.* 2018).

Present classification in Minnesota: Unlisted nonnative species

Proposed classification: Prohibited invasive species

Current distribution of species: Upper East Africa and West Africa, between 27 degrees north and 7 degrees south latitudes. It was intentionally introduced to the United States in 1977 in Texas reservoirs for sport-fishing however it is believed no self-sustaining populations were established (Howells and Garrett 1992). Nile perch has not been found in Minnesota.

Eligibility Screening

These three questions determine whether the DNR has authority to regulate the species under *Minnesota Statutes*, chapter 84D.

1. Is the species an aquatic plant or wild animal? For the purposes of this question, “species” includes “subspecies, genotypes, cultivars, hybrids, or genera” (*Minnesota Statutes*, section 84D.04 subd. 1).
 - Choose Yes or No; if yes, continue.
2. Is the species a pathogen or terrestrial arthropod regulated under *Minnesota Statutes*, sections 18G.01 to 18G.15? (*Minnesota Statutes*, section 84D.14(1))
 - Choose Yes or No; if no, continue.
3. Is the species a mammal or bird defined as livestock in statute? (*Minnesota Statutes*, section 84D.14(1)).
 - Choose Yes or No; if no, continue.

Classification Screening

Is it nonnative?

To be classified as an invasive species under Minnesota Statutes, the species must be “nonnative”; that is, not “native” as defined in Minnesota Statutes, section 84D.01, subd. 11. This has two components.

1. Is the species nonnative in Minnesota?

- 1.1. **Is the species naturally present or reproducing in Minnesota?** No. Nile perch are native to central, western, and eastern Africa (USFWS 2014). They were first introduced to the United States in Texas in 1977 (Howells 1992).
- 1.2. **Does the species naturally expand from its historic range into Minnesota?** No. Nile perch are native to Africa (USFWS 2014). They were first introduced to the United States intentionally for

stocking in reservoirs in Texas (Howells 1992). Nile perch can spread naturally through connecting waterways, but there is no evidence of introduced populations expanding from Texas, nor have individuals of this species been reported in the United States outside of Texas (Howells 1992; Howells and Garrett 1992).

How certain are these answers? 1a. Very certain; supported by peer-reviewed literature; 1b. Very certain; supported by peer-reviewed literature.

Likelihood of introduction

This is a criterion for classification of an invasive species under Minnesota Statutes, section 84D.04, subd. 2(1). The terms “introduce” and “introduction” are defined in Minnesota Statutes, section 84D.01.

2. Is the species likely to be introduced to Minnesota if it is allowed to enter or exist in the state?

Nile perch could be introduced to Minnesota by the following pathways:

- **Fishing:** Nile perch could potentially be introduced through fishing. As a fish with rapid and sizeable growth, Nile perch are sought after on African angling tours. Nile perch could be intentionally released for game fishing or for prey population control in the United States. Individuals or fry could be purposely or accidentally released outside of the intended area.
- **Aquaria:** Nile perch could be introduced through aquaria. Nile perch are available on online aquaria stores for purchase. An owner could release a live Nile perch into Minnesota waters. Because Nile perch can grow to up to 200 kg they could enter Minnesota waters if the owner could no longer contain them.
- **Aquaculture:** Nile perch are unlikely to be introduced through aquaculture. Nile perch are currently farmed in parts of the world but there are not currently any aquaculture operations using this species in Minnesota. As of 2019, there have not been requests to the DNR about acquiring Nile perch for aquaculture.
- **Food market:** Nile perch, dead or live, are illegal to import to the U.S. because they are listed as injurious wildlife under the Lacey Act (USFWS 2017). While Nile perch can be found in food markets in Europe, Nile perch is not widely available for consumption in the United States. In the past, the United States only imported the Nile perch fillets as a substitute for white fish (Josupeit 2006).

How certain is this answer? Reasonably uncertain. We did not find documentation that Nile perch have ever been brought into or introduced to Minnesota.

Likelihood of survival

This is a criterion for classification of an invasive species under Minnesota Statutes, section 84D.04, subd. 2(2). The term “naturalize” is defined in Minnesota Statutes, section 84D.01 as “to establish a self-sustaining population...in the wild.”

3. Is the species likely to naturalize in Minnesota if it were introduced? No. Nile perch are native to tropical freshwater lakes and waterbodies (between latitudes 27 degrees N and 7 degrees S) (Froese and Pauly 2010). They spawn year around, and juveniles prefer shallow sheltered areas (Witte 2009). It was observed that Nile perch did not reproduce during the three colder winter months in Lake Chad (Hopson, 1972). Given the cold temperatures of Minnesota waters, and the seasonal ice cover on most lakes, it is not likely that Nile perch will have the habitat requirements necessary to establish reproducing populations that will naturalize in the state.

Populations of Nile perch stocked in Texas did not survive nor “establish self-sustaining populations,” and cold water temperatures are believed to have contributed to their lack of success (Howells 1992). As Minnesota waters are colder than Texas, it is not likely this species will successfully reproduce in Minnesota.

Furthermore, a climate match study conducted by the Australian Bureau of Rural Sciences in 2010 classified Minnesota as the “lowest climate match” for Nile perch. The Minnesota Department of Natural Resources used the U.S. Fisheries and Wildlife Risk Assessment Mapping Program and found a similar finding: Minnesota and its neighboring states have a low chance of Nile perch establishing populations (Figure 1).

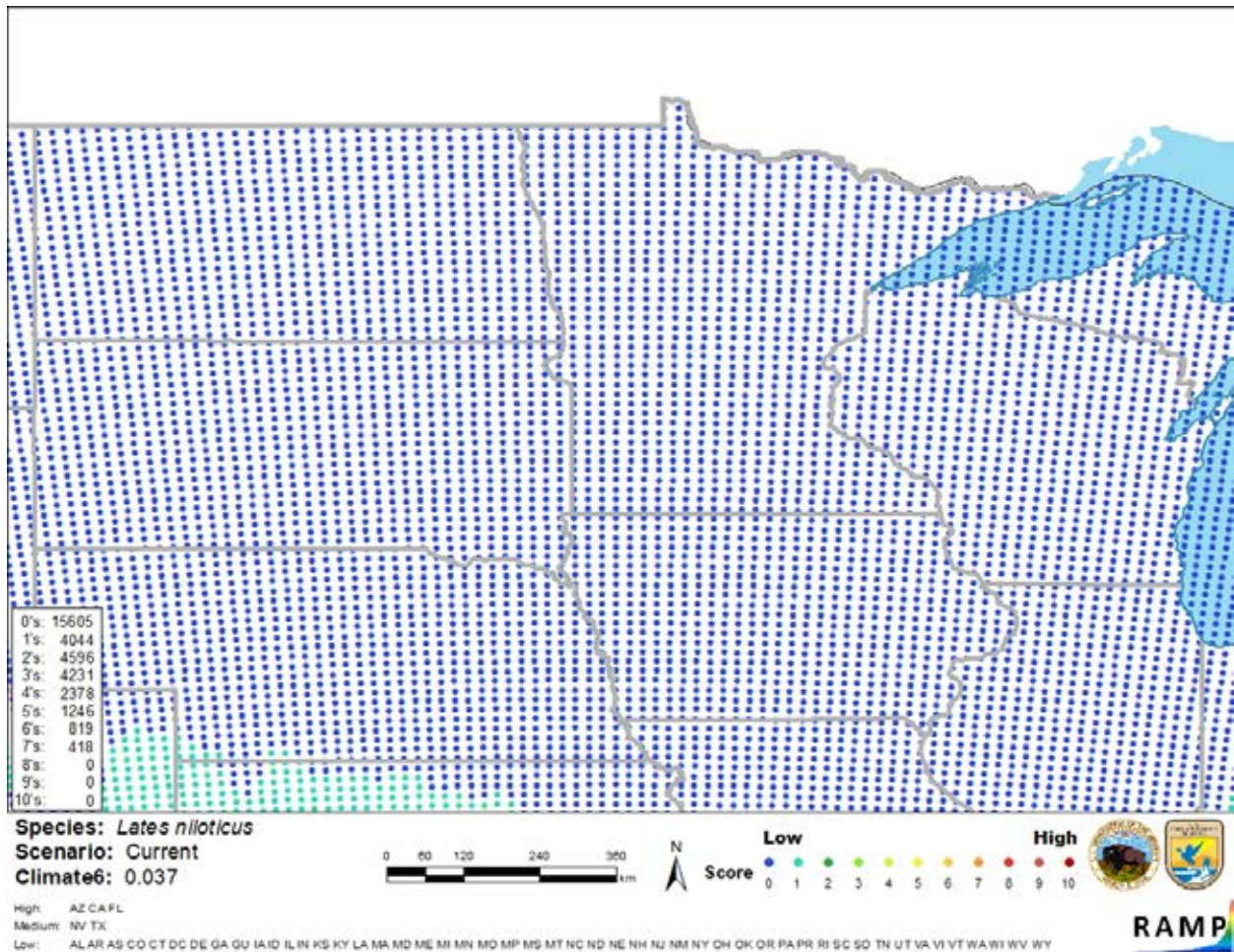


Figure 1. Risk Assessment Mapping Program (RAMP; Sanders et al. 2014) climate risk assessment for *Lates niloticus* in Minnesota and neighboring states. Assessment was conducted in 2019 using GBIF data, USGS NAS Database (Nico et al. 2019), and literature sources. 0 = Lowest Match, 10 = Highest match.

How certain is this answer? Very certain; we found few studies on the potential of Nile perch naturalization in the United States; however, the results of the attempted introduction into Texas are supported by peer-reviewed literature, and the Australian Climate Match model is referenced in the U.S. Fish and Wildlife Service’s risk assessment of Nile perch.

Potential negative impacts

For a nonnative species to be defined as “invasive” under Minnesota Statutes, section 84D.01, subd. 9a, the species must: cause, or have the potential to cause economic or environmental harm, harm to human health; or threaten or have the potential to threaten the use of natural resources in the state. This question has four components: economic, environmental, health, and natural resources.

4. Is the nonnative species an invasive species as defined under Minnesota law?

4.1. Does the species cause, or may it cause, economic harm? Yes, this species may cause economic harm. Economic impacts of Nile perch beyond the region of Lake Victoria in Africa have not been well studied. In the Lake Victoria region, introduced Nile perch became an important product of the commercial fishing industry, with catches averaging close to US \$540 million per year (Balirwa 2007). It is unlikely that Nile perch will establish in Minnesota because of its temperature requirements, but if released during the summer there is potential for short-term economic harm because they could disrupt food chains and lower the sport-fishing value of the waterbody during the summer.

How certain is this answer? Reasonably uncertain, little research on the effects of Nile perch in United States fisheries has been conducted.

4.2. Does the species cause, or may it cause, environmental harm? Yes, Nile perch can cause environmental harm where they are established. Nile perch are a generalist top predator which can diminish or eliminate native species lower on the food chain (USFWS 2014). In Minnesota, only Nile perch introduced in the summer would have a negative impact. Nile perch can diminish prey populations, disrupt prey reproduction, and compete with native aquatic predators for resources (USFWS 2014). The introduction of Nile perch to Lake Victoria and other non-native waters in Africa contributed to the extinction of many endemic fishes (Ogutu-Ohwayo 1990b, Kaufman 1992, and Witte et al. 1992). Surviving native species in Lake Victoria also experienced severe declines in their population levels.

Some literature discusses how the introduction of Nile perch can lead to eutrophication, with the resultant algae blooms creating anoxic conditions that further decrease native fish populations (Balirwa 2007, Kaufman 1992, Ogutu-Ohwayo 1999, and Witte 2009). However, not all literature supports this hypothesis, making lake eutrophication a potential but not certain risk associated with Nile perch introduction (Hecky 1993, Verschuren et al. 2002, and Witte 2009).

Nile perch show strong invasive qualities, and have been listed as one of the world's 100 worst invasive alien species by the Invasive Species Specialist Group (ISSG) and the International Union for Conservation of Nature (IUCN) (Lowe et al. 2000).

Nile perch is also known as a transmitter of a number of aquatic parasites and diseases including: Sporozoa infection, *Dolops* infection, *Ergasilus* disease, Gonad Nematodosis disease, and *Diplectanum* infection (Froese and Pauly 2010).

How certain is this answer? Reasonably certain, supported by peer-reviewed literature.

4.3. Does the species cause, or may it cause, harm to human health? No documentation of harm to human health was found.

How certain is this answer? Reasonably certain, documentation on negative impacts to human health was not found.

4.4. Does the species threaten, or may it threaten, the use of natural resources in the state? Potentially. Nile perch may threaten native species and sport-fishing over a short term. They would only be able to survive in Minnesota during the summer and, as a generalist feeder, could potentially diminish the populations of both native species and prized trophy species.

How certain is this answer? Reasonably certain, supported by peer-reviewed literature.

Natural resource impacts

This is a criterion for classification of an invasive species under Minnesota Statutes, section 84D.04, subd. 2(3).

5. Would the species have potential adverse impacts in Minnesota, in particular on: native species, outdoor recreation, commercial fishing, and other uses of natural resources in the state?

- Choose Yes or No; if yes, continue to 5.1.

5.1. If so, what would be the magnitude of these adverse impacts? Depending on the season, Nile perch impacts on native species could range from benign to severe. Nile perch would only be likely to survive in the summer in Minnesota. In every other season Nile perch would die from the cold temperature. During summer Nile perch could have potentially adverse impacts on native species because they are voracious generalist feeders and they do not have any natural predators in Minnesota. The magnitude is uncertain as their survival would be short-term, but research on other Nile perch introductions shows that Nile perch have significant negative impacts on native species, reducing or eliminating native fish populations (Ogutu-Ohwayo 1990b, Kaufman 1992, and Witte et al. 1992).

While Nile perch impacts on water quality and eutrophication are not clear, the potential for Nile perch to disrupt food chains and nutrient cycles could result in adverse impacts to Minnesota water quality and outdoor recreation.

Nile perch could disrupt trophy fish food chains by feeding on their prey or on the other trophy fish. Nile perch is also considered a trophy and large commercial fish, so it has the potential to impact commercial and sport fishing in Minnesota, but the magnitude is uncertain.

How certain is this answer? Moderately certain; some adverse effects are supported by peer-review literature, others have not been, or are still being, researched.

Management options

This is a criterion for classification of an invasive species under Minnesota Statutes, section 84D.04, subd. 2(4).

- 6. Would we be able to eradicate, or control the spread of, the species once it is introduced in Minnesota?** Yes. Without human intervention, introduced Nile perch would not survive in Minnesota due to cold seasonal temperature. There are no known methods for controlling or eradicating Nile perch in the wild. Due to its economic value, few eradication efforts have been attempted in areas where Nile perch are nonnative (Witte 2009). Overharvesting of fish has been shown to deplete wild populations, but there is no evidence that fishing can fully eliminate populations (Njiru et al. 2009). It is possible to reduce the risk of the spread of Nile perch by not moving individual fish between unconnected water bodies and not releasing fish into new waters.

How certain is this answer? Reasonably certain; supported by peer-reviewed literature.

Other relevant information

This is a criterion for classification of an invasive species under Minnesota Statutes, section 84D.04, subd. 2(5). Information that may be included here includes, but is not limited to: economic impacts; regulations in other jurisdictions; and ongoing monitoring programs.

- 7. Are there other criteria the DNR commissioner deems appropriate? If so, discuss.**

Regulations in other jurisdictions:

- Nile perch are listed as Injurious Wildlife under the Lacey Act (18 U.S.C. § 42(a)(1)), which bans the import of injurious species into the United States and its territories. A court ruling in 2017 “struck down the longstanding interpretation of the U.S. Fish and Wildlife Service (FWS) that Title 18 also prohibited the shipment of injurious species across state lines” (Otts 2017); however, the U.S. Fish and Wildlife Service may still prohibit interstate transport of state-regulated species. Therefore, listing Nile perch as a prohibited invasive species in Minnesota will help to prevent its introduction and spread in the U.S. and to our neighboring jurisdictions.
- Nile perch are regulated as invasive species in nearby states: Iowa, Illinois, Ohio, and Wisconsin (Great Lakes Commission, Memo dated December 14, 2017; Iowa Natural Resources Commission 2008).

- Nile perch is listed as a prohibited exotic species in Texas, meaning that “no person may possess or place them into water of [Texas] except as authorized by the department [of Parks and Wildlife]. Permits are required for any individual to possess, sell, import, export, transport, or propagate [Nile perch] for zoological or research purposes, aquaculture, or aquatic weed control” (Texas Parks and Wildlife, no date).

Summary

Summarize the findings of the screening form, including whether the species is nonnative and invasive as defined by Minnesota Statutes, chapter 84D, and characterize the overall certainty of the answers provided above.

Note that certain answers in the screening form may indicate that the species is not a good candidate for designating as a prohibited or regulated invasive species under *Minnesota Statutes*, chapter 84D:

- If you answered “Yes” to **either** 1a or 1b, the species is not “nonnative” as defined under *Minnesota Statutes*, chapter 84D; consider regulation under other authorities.
- If you answered “No” to **all** of 4a, 4b, 4c, and 4d, then the species is nonnative but may not be “invasive” as defined under *Minnesota Statutes*, chapter 84D; consider whether proposed introductions of this species should follow *Minnesota Rules*, part 6216.0290.

Summary: Nile perch is a nonnative fish that has the potential to negatively impact Minnesota waters. Nile perch is not likely to establish in the state if introduced, however short-term survival here could negatively impact native fish populations through competition and predation. Nile perch is not known to be in any waters connected to Minnesota, but fishing and aquaria are potential pathways it could be introduced.

How certain is this classification summary, overall? Reasonably uncertain; little is known about the impacts Nile perch can produce in a short amount of time.

Recommendation

The DNR may choose to recommend whether to designate the species as a prohibited invasive species, a regulated invasive species, or whether the species should be an unlisted nonnative species (Minnesota Statutes, section 84D.06). Briefly justify this recommendation and include any additional information such as recommended deadlines for updating this screening form and revisiting this decision and gaps in our knowledge that could be addressed by researchers.

Recommendation: Designate Nile perch as a prohibited invasive species.

Appendix

Qualitative uncertainty ratings

Uncertainty rating	Description	Abbreviation
Very certain	As certain as I am going to get	VC
Reasonably certain	Reasonably certain	RC
Moderately certain	More certain than not	MC
Reasonably uncertain	Reasonably uncertain	RU
Very uncertain	A guess	VU

Uncertainty ratings from: “Generic Nonindigenous Aquatic Organisms Risk Analysis Review Process”, Risk Assessment and Management Committee report to the Aquatic Nuisance Species Task Force, 1996. Available [online](http://www.anstaskforce.gov/Documents/ANSTF_Risk_Analysis.pdf) (www.anstaskforce.gov/Documents/ANSTF_Risk_Analysis.pdf; accessed February 14, 2020).

Version notes

References to Minnesota Statutes are to the 2019 version.

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