Nile Perch (*Lates niloticus*)
Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, September 2014
Revised, March 2018
Web Version, 8/27/2018

Photo: Pam Schofield, U.S. Geological Survey.

1 Native Range and Status in the United States

Native Range
From Schofield (2018):

"Much of central, western and eastern Africa: Nile River (below Murchison Falls), as well as the Congo, Niger, Volga, Senegal rivers and lakes Chad and Turkana (Greenwood 1966). Also present in the brackish Lake Mariot near Alexandria, Egypt."

Status in the United States
From Schofield (2018):

"**Status:** All populations are probably extirpated (Howells [1992])."

"**Nonindigenous Occurrences:** Scientists from Texas traveled to Tanzania in 1974-1975 to investigate the introduction potential of *Lates* spp. into **Texas** reservoirs (Thompson et al. 1977). Temperature tolerance and trophic dynamics were studied for three species (*L. angustifrons*, *L.*

microlepis and *L. mariae*). Subsequently, several individuals of these three species were shipped to Heart of the Hills Research Station (HOHRS) in Ingram, Texas in 1975 (Rutledge and Lyons 1976). Also in 1975, Nile perch (*L. niloticus*) were transferred from Lake Turkana, Kenya, to HOHRS. All fishes were held in indoor, closed-circulating systems (Rutledge and Lyons 1976)."

"From 1978 to 1985, *Lates* spp. was released into various Texas reservoirs (Howells and Garrett 1992). Almost 70,000 *Lates* sp. larvae were stocked into Victor Braunig (Bexar Co.), Coleto Creek (Goliad Co.) and Fairfield (Freestone Co.) reservoirs between 1978 and 1984. In 1985, two *L. angustifrons*, six *L. mariae* and six *L. niloticus* were released into Smithers Reservoir (Ft. Bend Co.). It was thought that the fishes would provide good sportfishing opportunities as well as reduce populations of "rough" fishes (e.g., *Cyprinus carpio*, *Dorosoma cepedianum*, *Ictiobus bubalis, Carpiodes carpio*) through predation (Thompson et al. 1977). It is thought that the introductions were relatively unsuccessful and that the introduced *Lates* spp. have since been extirpated (Howells and Garrett 1992; Clugston 1990; Texas Parks and Wildlife News 1993)."

"One individual (115.5 cm, 27.2 kg) was collected from Smithers Reservoir in January 1990 (Howells and Garrett 1992). It is believed that this fish died due to cold water temperatures"

In 2016, the U.S. Fish and Wildlife Service designated the Nile perch as an injurious species under the injurious wildlife provisions of the Lacey Act (18 U.S.C. 42). This designation prohibits the importation and transport into certain U.S. jurisdictions of the live species, hybrids, and eggs.

Means of Introduction to the United States

From Schofield (2018):

"Intentional stocking by the Texas Parks and Wildlife Department for sport fishing."

Remarks

From Schofield (2018):

"Harrison (1991) found difficulties in separating the different *Lates* species introduced into African lakes. He recommended a reappraisal of Nile perch taxonomy. As such, the positive identification of one or more of the *Lates* species introduced to Texas may eventually also be called into question."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2018):

"Kingdom Animalia
  Subkingdom Bilateria
    Infrakingdom Deuterostomia

Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Acanthopterygii
Order Perciformes
Suborder Percoidei
Family Centropomidae
Subfamily Latinae
Genus *Lates*
Species *Lates niloticus* (Linnaeus, 1758)"

"Current Standing: valid"

Size, Weight, and Age Range

From Froese and Pauly (2017):

"Maturity: L_m 74.3, range 53 - 85 cm
Max length : 200 cm TL male/unsexed; [Stone 2007]; common length : 100.0 cm SL male/unsexed; [van Oijen 1995]; max. published weight: 200.0 kg [Ribbink 1987]"

Environment

From Froese and Pauly (2017):

"Freshwater; demersal; potamodromous [Riede 2004]; depth range 10 - 60 m [van Oijen 1995]."

From Schofield (2018):

"Lower lethal temperatures have been reported from 12-15 ºC (Midgley 1968; Hopson 1972; Jensen 1975 -- All from Rutledge and Lyons 1976)."

Climate/Range

From Froese and Pauly (2017):

"Tropical; 27°N - 7°S"

Distribution Outside the United States

Native

From Schofield (2018):

"Much of central, western and eastern Africa: Nile River (below Murchison Falls), as well as the Congo, Niger, Volga, Senegal rivers and lakes Chad and Turkana (Greenwood 1966). Also present in the brackish Lake Mariot near Alexandria, Egypt."

From Azeroual et al. (2010):

“Benin; Burkina Faso; Burundi; Central African Republic; Chad; Côte d'Ivoire; Egypt; Eritrea; Ethiopia; Ghana; Guinea; Guinea-Bissau; Kenya; Liberia; Mali; Niger; Nigeria; Senegal; Sierra Leone; South Sudan; Sudan; Tanzania, United Republic of; Togo; Uganda; Zambia”

Introduced

From Azeroual et al. (2010):

“Cameroon; Congo; Congo, The Democratic Republic of the”

From CABI (2018):

“In the 1950s and 1960s, Nile perch […] was introduced into Lake Kyoga, Lake Victoria and Lake Nabugabo from Lakes Albert and Chad (Pringle, 2005). It spread into several satellite lakes of Lake Kyoga, e.g. Lakes Bisina, Nakuwa and Nyasala (Mwanja et al., 2001), and of Lake Victoria, e.g. Lake Sare (Aloo, 2003).”

Means of Introduction Outside the United States

Froese and Pauly (2017) list angling/sport, aquaculture, and fisheries as reasons for *L. niloticus* introduction.

From CABI (2018):

“Nile perch were unofficially introduced into Lake Victoria in August 1954, when individuals from Lake Albert were released at Jinja, Uganda (Amaras, 1986). In May 1960, local fishermen reported the first Nile perch from gillnet catches near Jinja (Gee, 1964). […] According to Gee (1964), a breeding population existed in the lake in 1962/63, probably centered in Hannington Bay and down the Buvumu Channel.”

“After heavy debates (Fryer, 1960; Anderson, 1961; Pringle, 2005), the first official introductions of Nile perch took place in May 1962 and September 1963 at Entebbe, Uganda. They originated from Lake Albert and comprised respectively 35 fishes between 16 and 43 cm, and 339 fingerlings (Gee, 1964). In the Nyanza Gulf, Kenya, eight Nile perch from Lake Turkana were released in 1963 (Arunga, 1981; Pringle, 2005).”

“According to Pringle (2005), the first Nile perch reported from Tanzanian waters was caught near Mwanza in October 1961. Other reports suggest that Nile perch was landed for the first time from Tanzanian waters of the lake in August 1963 at Musoma (Kudhongania and Cordone, 1974a).”

“The upsurge of Nile perch in Lake Victoria was first observed in the Nyanza Gulf, Kenya, in 1979. In Ugandan waters it occurred 2-3 years later and in the Tanzanian Mwanza Gulf 4-5 years later […]. At the beginning of the upsurge in the Mwanza Gulf in 1983/84 only sub-adult and adult fishes were found. The first juveniles appeared in 1985, suggesting that the initial increase of Nile perch was mainly caused by migration of sub-adults and adults (Goudswaard et al., 2008)."

"Nile perch were introduced into Lake Kyoga in 1954 and 1955 and into Lake Nabugabo in 1960 and 1963 (Ogutu-Ohwayo, 1993; Pringle, 2005). The aim of these introductions was to assess what effect Nile perch would have on fish faunas similar to that of Lake Victoria (Ogutu-Ohwayo, 1993), as it was not known then that Nile perch had been stocked already unofficially in the latter."

Short Description

From Froese and Pauly (2017):

"Dorsal spines (total): 7 - 8; Dorsal soft rays (total): 8-14. Diagnosis: mouth large and protrusible, lower jaw prominent; numerous villiform teeth present in jaws and on palate [Paugy 2003]. Preorbital [Eccles 1992] and preopercle denticulate [Eccles 1992; Paugy 2003]. A strong opercular spine present [Eccles 1992; Paugy 2003]. Caudal fin rounded [Eccles 1992; Paugy 2003]. Scales ctenoid, 54-74 along lateral line, followed by 6-8 pored scales on caudal-fin base; ceratobranchial (lower limb) of first gill arch with 12-14 gill rakers [Paugy 2003]. Coloration: body uniformly silvery [Paugy 2003] or dark greyish-blue dorsally, greyish-silver on flank and ventrally [van Oijen 1995]. Fins greyish; interior of eye conspicuously yellowish; juveniles brownish with lighter marbling [Paugy 2003]."

Biology

From Froese and Pauly (2017):

"Inhabits channels, lakes and irrigation canals. Adults inhabit deep water, while juveniles are found in shallow water. Feeds on fish especially clupeids and *Alestes* [Reed et al. 1967]; smaller fish also feed on larger crustaceans and insects. Juveniles are planktivorous [Bailey 1994]."

From Schofield (2018):

"The species inhabits a wide variety of habitats, including rivers, lakes, irrigation channels. It is relatively intolerant of low-oxygen waters, and therefore is somewhat restricted from entering swamps (Schofield and Chapman 2000)."

"Juvenile Nile perch feed on invertebrates (e.g., ephemeropteran naiads, anisopterans, zygopterans and chironomids) when small then switch to fishes with growth (Schofield and Chapman 1999). When fish prey is abundant, the Nile perch is piscivorous from a very small size (as small as 4 cm TL; Schofield and Chapman, unpublished data). The species is flexible in its feeding habits, and quickly adapts to new prey resources (Ogari and Dadzie 1988; Chapman et al. 2003)."

"The Nile perch reaches maturity at about 60-90 cm TL."

From Azeroual et al. (2010):

"Long spawning season February-August. It reproduces around the year, with peaks in the rainy season. It probably spawns in shallow sheltered areas."

Human Uses

From Froese and Pauly (2017):

"Fisheries: highly commercial; aquaculture: commercial; gamefish: yes"

From Azeroual et al. (2010):

"This species is well marketable. Its total production in the River Nile in 1996 was about 795 tons, i.e. it contributes about 1.3% of the total Nile catch. Its production in Lake Nasser was 904 tons, and in Wadi El-Rayan was 44 tons in the same years (Bishai and Khalil 1997). […] This is a highly commercial species, and is suffering from overexploitation in much of its native range […]"

Diseases

From Froese and Pauly (2017):

"Sporozoa Infection (*Hennegya* sp.), Parasitic infestations (protozoa, worms, etc.)
Dolops Infestation, Parasitic infestations (protozoa, worms, etc.)
Ergasilus Disease 6, Parasitic infestations (protozoa, worms, etc.) […]
Gonad Nematodosis Disease, Parasitic infestations (protozoa, worms, etc.)
Diplectanum Infestation, Parasitic infestations (protozoa, worms, etc.)"

From Kostoïngué et al. (2003):

"*Henneguya ghaffari* Ali, 1999, described for the first time in Egypt, has been found on gills and intestine of Nile perch *Lates niloticus* L. from Chad and Senegal (Africa). It formed plasmodia which induced lesions of infected tissues."

From Emere (2000):

"A total of 240 Specimen of *Lates niloticus* from River Kaduna were examined for ecto and endoparasites between August 1994 and July 1995. The fish acted as hosts for the endoparasitic helminths *Neoechinorhyncus*, *Camallanus*, *Euclinostomum* and *Proteocephalus* species. Only the ectoparasite *Argulus* species was recovered. The incidence and intensity of infection was higher for acanthocephalans and cestodes."

No OIE-reportable diseases have been documented for this species.

Threat to Humans

From Froese and Pauly (2017):

"Potential pest"

3 Impacts of Introductions

From Witte et al. (1992):

"In several publications (e.g. in Barel 1986, Acere 1988, Anonymous 1988, Harrison et al. 1989) it has been suggested that the Nile perch is only partly to blame for the decline of the haplochromines during recent years; another important cause being overfishing. In inshore areas of the Winam (= Nyanza = Kavirondo) Gulf where fishing is banned, haplochromine catches were considerably larger than in neighbouring areas where fishing is allowed (Anonymous 1988, Harrison et al. 1989). We agree that fishing has had deleterious effects on haplochromines (Marten 1979, Witte 1981, Witte & Goudswaard 1985, Goudswaard 1988). The decline of the catch rates in the sub-littoral areas of the Mwanza Gulf […] was initially the result of the trawl fishery which started in the 1970s on the unexploited stocks in this area. At the beginning of the 1980s, particularly from 1983 on […], rapidly increasing predation by Nile perch on the haplochromines was added to this fishing pressure. Consequently, it is difficult to separate the effects of fishing and Nile perch predation in the sublittoral area of the Mwanza Gulf in the 1980s. However, even in areas without fishing pressure, like the deepwater station north of Kome Island, haplochromines disappeared rapidly […]. Nile perch were already abundant in these areas when the trawl surveys started in 1984/1985 (Goudswaard & Witte 1985, Goudswaard & Ligtvoet 1988). In the littoral habitats of Butimba Bay […] virtually no fishing occurred except for our own sampling program; from 1981 to 1987 there was no sampling in this area. In spite of this, a dramatic decrease in species number was observed […]."

"There is a remarkable coincidence of Nile perch increase and haplochromine decline in various areas of Lake Victoria. In the Winam Gulf the Nile perch boom started in 1978/1979, while simultaneously haplochromines disappeared from the catches (Arunga 1981, Okemwa 1981, Hughes 1983). The upsurge of the Nile perch in the eastern part of the Tanzanian waters (e.g. near Ukerewe and in the Speke Gulf) occurred later than in the Winam Gulf. Large Nile perch catches (average 200 kg h^{-1}) and low haplochromine catches in the eastern part were not observed before the end of 1983 (Goudswaard & Witte 1985). The mean catch rate of Nile perch in the lightly fished south west corner of the lake (Emin Pasha Gulf) was still low (54 kg h^{-1}) in June 1985. However, Nile perch catch rates in this area doubled during the period 1985 to 1986 […], while haplochromine catches declined strongly (by ca. 80%) . We conclude that the impact of Nile perch predation on haplochromines has been much greater than that of fishing. High fishing pressure on haplochromines existed only locally in the littoral and sub-littoral zone (e.g . near densely populated areas); Nile perch, on the contrary, occurs lakewide. The fishery never resulted in the complete eradication of a haplochromine community in any habitat, though it did cause the local disappearance of individual species (Marten 1979, Witte & Goudswaard 1985, Goudswaard 1988). However, the Nile perch boom coincided with the disappearance of complete haplochromine communities, even in areas where fishing pressure was absent. Stomach content analyses revealed that haplochromine cichlids were indeed the main prey of Nile perch until the former had been virtually eradicated (Gee 1969, Okemwa 1981, Hughes 1986, Ogari & Dadzie 1988, Ligtvoet & Mkumbo 1990, Ogutu-Ohwayo 1990[a]).”

From Wanink and Goudswaard (1994):

“The population of Nile perch, a large predator which has been introduced into the lake by man, increased explosively at the expense of many haplochromine cichlid species. At the same time, numbers of a small cyprinid (dagaa) rose sharply. Previously Pied Kingfishers on Lake Victoria fed mainly on haplochromines. Only the youngest nestlings depended on dagaa as primary food. The current diet of adult birds clearly reflects the changes which have occurred in the fish community. Pellet analysis reveals a shift towards a diet composed of almost 100% dagaa. The change in prey species composition has increased the number of fish a kingfisher needs to catch daily in order to meet its energetic demands, because: (1) the mean size of haplochromines is larger than that of dagaa; (2) the mean size of dagaa has decreased since the increase in Nile perch; (3) the weight of dagaa is lower than that of haplochromines of equal size; (4) mainly juvenile dagaa and adults in poor condition are accessible to kingfishers.”

From CABI (2018):

“It has been suggested that the algal blooms that occurred concomitantly with the Nile perch boom in different areas of Lake Victoria, were (partly) caused by a top down effect, i.e. disappearance of the phytoplanktivorous and detritivorous haplochromine cichlids by Nile perch predation (Kilham and Kilham, 1990; Kaufman, 1992; Hecky and Bugenyi, 1992; Goldschmidt et al., 1993; Ochumba, 1995; Ogutu-Ohwayo, 1999). Conversely, it has been suggested that the increase of the eutrophication that started already in the 1920s had a negative impact on haplochromines and provided an opportunity for the Nile perch boom (Hecky, 1993; Verschuren et al., 2002; Kolding et al., 2008).”

“Other environmental issues associated with this species include the demand for firewood for processing the fish. At Wichlum Beach (Kenya) the number of smoking kilns increased between 1984 and 1991 from about ten to over 50 (Riedmiller, 1994). Although the majority of the Nile perch catches are currently sold to the fish filleting factories, unsuitable individuals (e.g. fish that are too small) and waste from the factories are still smoked and/or fried. These activities contribute to deforestation, and consequently to land erosion and eutrophication of the lake.”

“It has so far been impossible to establish the causal relationship between the Nile perch boom and eutrophication, and the relative impact on haplochromine cichlids of each of these phenomena separately. There are a number of reasons for this. First, both the Nile perch upsurge in Lake Victoria and the increase of eutrophication occurred between the late 1960s and early 1980s. Furthermore, systematic data on haplochromine abundance and diversity were not collected until 1969/70 and 1978, respectively (Kudhongania and Cordone, 1974a,b; Witte, 1981).”

“Eutrophication resulted in decreases in dissolved oxygen levels and increased water turbidity. The latter especially has a negative impact on haplochromines and among others resulted in hybridization of several species (Seehausen et al., 1997a; 2008). Nevertheless, there is ample evidence that Nile perch predation did have a strong impact on haplochromine biodiversity (e.g. Witte et al., 2007a,b; Chapman et al., 2008).”

“In 1983 Nile perch started to boom in the Mwanza Gulf […], mainly due to immigration of sub-adult fishes (Goudswaard et al., 2008). Concomitantly, the decline of some groups of haplochromines accelerated strongly in the sub-littoral and open waters, and shortly after the Nile perch peak in 1986-1987 haplochromines had virtually disappeared from the catches in these areas. Until the haplochromines had disappeared, they were the main food items of Nile perch (Ligtvoet and Mkumbo, 1990; Mkumbo and Ligtvoet, 1992). Scanty data from other parts of the lake indicate similar accelerations of the decline of haplochromines after Nile perch began to boom in those areas (Witte et al., 1995). In shallow areas, with relatively low Nile perch densities and areas with structured bottoms, such as rocky shores, haplochromines were less affected (Witte et al., [1992]; Seehausen et al., 1997b).”

“In Lake Kyoga and Lake Nabugabo, where Nile perch had also been introduced as well, the haplochromines also declined strongly with increasing Nile perch densities (Ogutu-Ohwayo, 1990a,b; 1993; 1995). In contrast, in several small satellite lakes of Lake Victoria and Lake Kyoga, where Nile perch was absent, haplochromines remained abundant (Ogutu-Ohwayo, 1993; Namulemo and Mbabazi, 2000; Aloo, 2003; Mbabazi et al., 2004). However, it has to be mentioned as a confounding factor, that in some of these lakes the water was also clear (Kaufman et al., 1997; G. Namulemo, Fisheries Resource Research Institute, Uganda, personal communication, 2009). There are a few satellite lakes where Nile perch and haplochomines seem to coexist. Aloo (2003) found both haplochromines and Nile perch in the murky Lake Sare (transparency 0.25 m), but did not record when Nile perch entered this lake and how many cichlid species used to live there before Nile perch introduction. Nile perch and haplochromines also seem to coexist in Lake Saka in Uganda (Witte et al., 2007b). In Lake Nabugabo haplochromines apparently found refugia in the hypoxic and highly structured shoreline wetlands (Chapman et al., 1996; 2002; 2003). The same may hold for a few wetland species of Lake Victoria, but not for the sub-littoral and deepwater species, or for those of sandy shores of Lake Victoria, because many of them were strongly restricted to these habitats (e.g. Witte (1984)) that are often at great distances from wetlands.”

“Nile perch predation and competition also caused declines in native species other than haplochromines, e.g. the lung fish (*Protopterus aethiopicus*), catfishes (e.g. *Bagrus docmak*, *Xenoclarias eupogon*, *Synodontis victoria*) (Ogutu-Ohwayo, 1990a,b; Goudswaard and Witte, 1997; Goudswaard et al., 2002 a,b). By the end of the 1980s only three fish species were common in sub-littoral and offshore waters of Lake Victoria; these were the small indigenous cyprinid *Rastrineobola argentea*, and the introduced Nile perch and Nile tilapia (Ogutu-Ohwayo, 1990[b]; Wanink, 1999; Goudswaard et al., 2002b). Together, they dominated the fish landings by more than 80% […] (Reynolds et al., 1995; Witte et al., 2009).”

"In the course of the 1990s, after a decline in Nile perch in Lake Victoria due to intensive fishing, a slow resurgence of some haplochromine species was observed, mainly zooplanktivores and detritivores (Witte et al., 2000; 2007a,b; Seehausen et al. 1997b; Balirwa et al., 2003). Of each group only about 30% of the species recovered and the ratio between detritivores and zooplanktivores reversed (Witte et al., 2007a,b). Before the 1980s detritivores made up about 50% of the haplochromine biomass in the sublittoral waters and zooplanktivores about 25% (Goldschmidt et al., 1993), whereas by 2001 detritivores constituted only 15% and zooplanktivores more than 80%. However, the majority of the species did not recover. Many of the highly specialized trophic types like scale eaters, parasite eaters and prawn eaters have not been caught since the 1980s, whereas piscivores and paedophages are extremely rare now, both with respect to numbers of individuals and species."

"The hypothesis that Nile perch had a large impact on haplochromine biomass is supported by the observations of a partial recovery of haplochromines in Lake Victoria, Lake Nabugabo and Lake Kyoga, following declines in Nile perch due to heavy fishing pressure (Ogutu-Ohwayo, 1995; Witte et al., 2000; Chapman et al., 2003; 2008; Getabu et al., 2003; Mbabazi et al., 2004). On the other hand, the incomplete recovery in Lake Victoria suggests that Nile perch may not be the only factor (Witte et al., 2007b)."

In 2016, the U.S. Fish and Wildlife Service designated the Nile perch as an injurious species under the injurious wildlife provisions of the Lacey Act (18 U.S.C. 42). This designation prohibits the importation and transport into certain U.S. jurisdictions of the live species, hybrids, and eggs.

4 Global Distribution

Figure 1. Reported global distribution of *Lates niloticus*. Map from GBIF Secretariat (2017).

5 Distribution in the United States

Figure 2. Collection locations of *Lates niloticus* in the United States. All locations represent either failed or extirpated populations, so none of the collection locations were used as source locations for climate matching. Map from Schofield (2018).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) was low across most of the contiguous U.S. Southern Florida, western Arizona, and southern and central California showed medium to high matches. Climate 6 score indicated that *L. niloticus* has a medium climate match overall to the contiguous U.S. The scores indicating a medium climate match are those between 0.005 and 0.103; Climate 6 score for *L. niloticus* was 0.030.

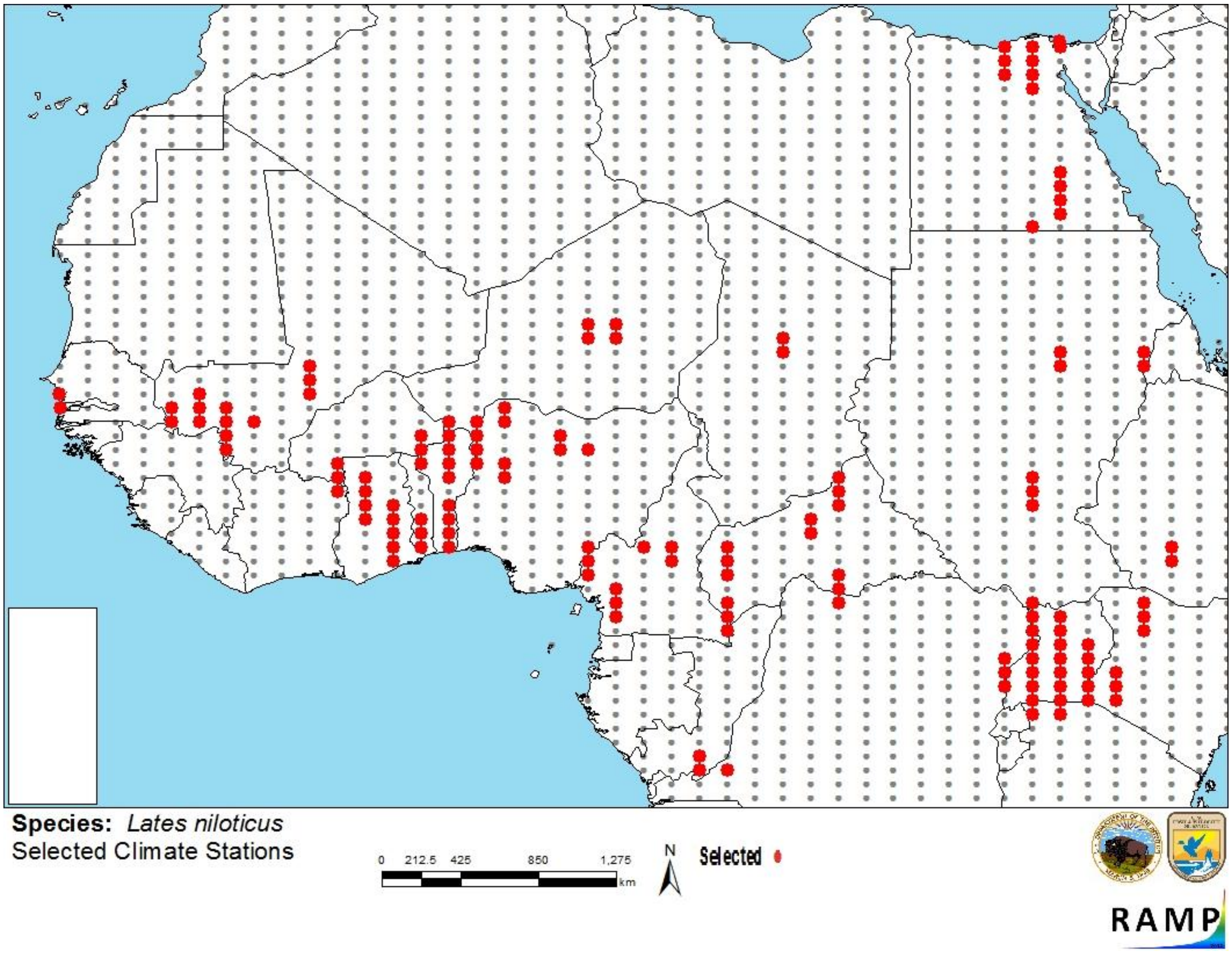

Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations in Africa selected as source locations (red) and non-source locations (gray) for *L. niloticus* climate matching. Source locations from GBIF Secretariat (2017).

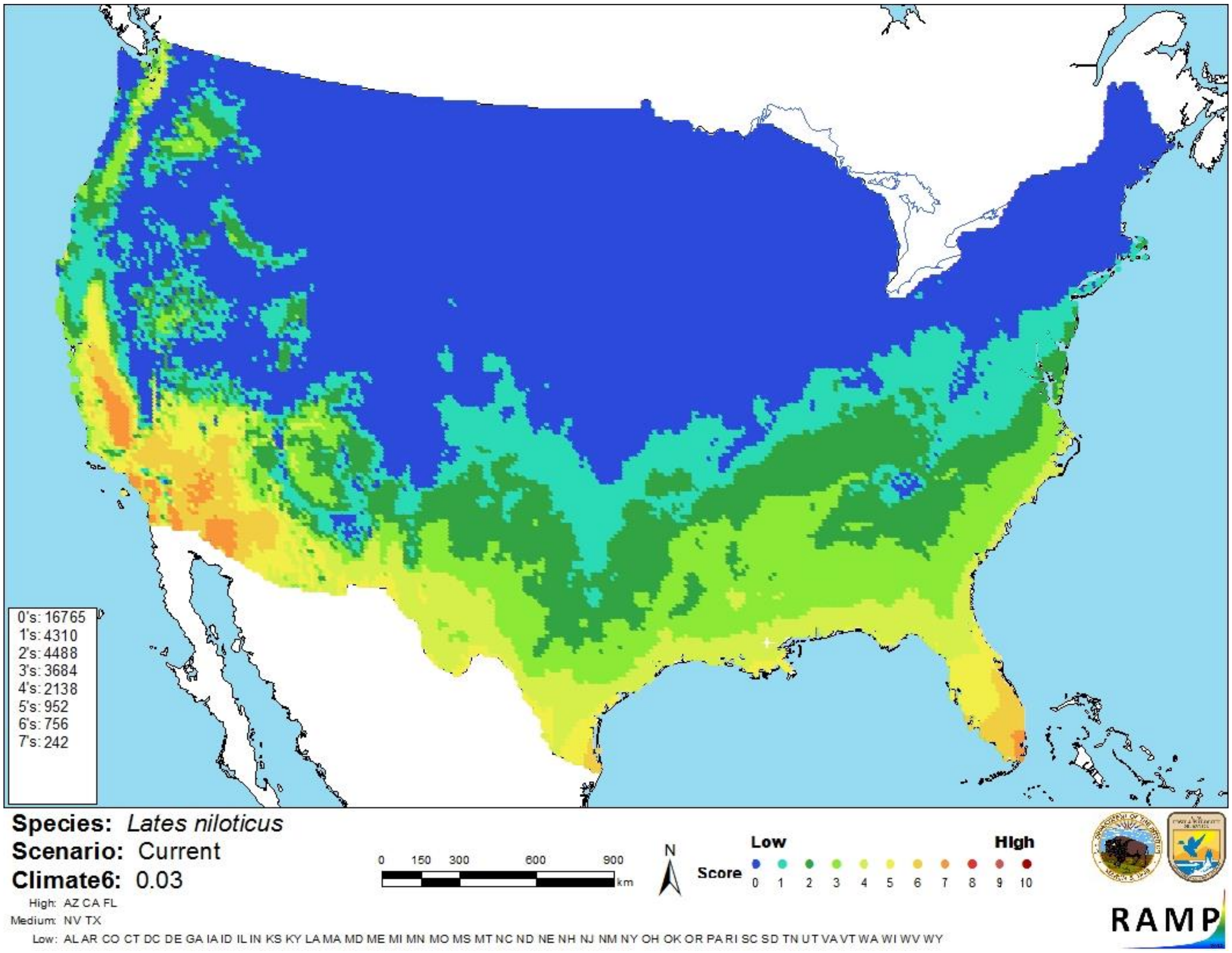

Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *L. niloticus* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match.

The "High", "Medium", and "Low" climate match categories are based on the following table:

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
0.000≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

7 Certainty of Assessment

Information on the biology, invasion history, and impacts of this species is sufficient to give an accurate description of the risk posed by this species. Peer reviewed literature on the impacts of the species is readily available. Certainty of this assessment is high.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Lates niloticus is a species of perch native to much of tropical Africa. It has been introduced to Lake Victoria (Kenya, Tanzania, and Uganda), Lake Kyoga (Uganda), Lake Nabugabo (Uganda), and some of their satellite lakes. All three large lakes have reported major declines of native haplochromine cichlids at the same time as *L. niloticus* densities increased. Partial recovery of haplochromine cichlid populations in Lake Victoria more recently as fishing reduced the *L. niloticus* population implicates *L. niloticus* as a strong influence on the native species decline. Introductions were attempted in Texas reservoirs in the latter part of the twentieth century, but all populations either failed or were extirpated. In 2016, the U.S. Fish and Wildlife Service designated the Nile perch as an injurious species under the injurious wildlife provisions of the Lacey Act (18 U.S.C. 42). Climate match to the contiguous U.S. was medium, with areas of highest match occurring in California, Arizona, and Florida. Overall risk posed by this species is high.

Assessment Elements

- **History of Invasiveness (Section 3): High**
- **Climate Match (Section 6): Medium**
- **Certainty of Assessment (Section 7): High**
- **Overall Risk Assessment Category: High**

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

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10 References Quoted But Not Accessed

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

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