

Northern Snakehead Risk Analysis for Arizona

**Wanted dead, not alive
INVADING SPECIES**

Northern Snakehead, *Channa argus*



Aliases: Unknown



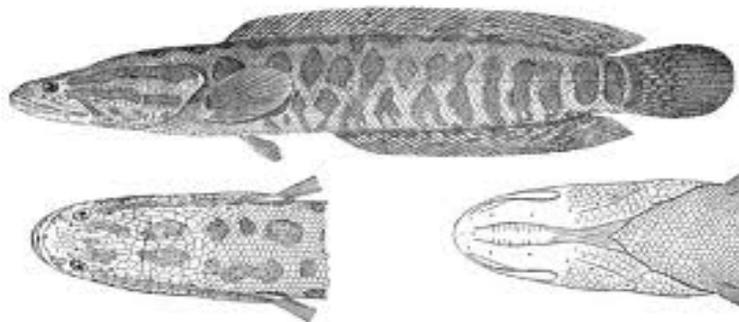
Name

Northern snakehead (*Channa argus*)

Description

Snakehead body shape is torpedo-like, tapering towards the tail. They have a single, long dorsal fin, a long anal fin, and a small head with a large mouth. Northern snakeheads are cylindrical fish that can grow up to 85 cm in length. They have a scaled head that looks like a snake, hence the name, with a large mouth with sharp teeth, a truncated, not rounded tail. Snakeheads are easily identified by dark irregular blotches along their sides on a background of golden tan to pale brown. The fish is capable of darkening its background colors to the point of almost obscuring the blotches. There is a dark stripe from just behind the eye to the upper edge of the operculum with another dark stripe below from behind the orbit extending to the lower quadrant of the operculum (www.issg.org).

Channa argus (Cantor, 1842)
Northern Snakehead



After Berg, 1933

Life History

Northern snakeheads are voracious feeders. Post-larval fish feed on plankton and small insect larvae and their diets change to small crustaceans and fish when they reach the juvenile stage. As adults they feed primarily on fishes, but will also eat frogs, crustaceans and aquatic insects. On occasion, northern snakeheads will predate aquatic birds and small mammals. Northern snakeheads are reported to school for feeding and feeding in this species peaks at dusk and pre-dawn. It is also reported that actively feeding adults make grunting noises "like pigs". (Courtenay, W.R., Williams, J.D. 2004). The physiological and ecological characteristics of the northern snakehead allow for competitive advantages over native species. All snakeheads have the ability to breathe air. The advantage to being an air breather is obvious, and snakeheads can

live in hypoxic conditions unlike most native species. Unlike some snakehead species, the northern snakehead lacks the ability to migrate over dry land as an adult, but young can migrate over land in areas where some water is present. The temperature tolerance of the northern snakehead gives it the ability to live under ice, ensuring the survival of this species between seasons. Unlike most native fishes, northern snakeheads protect their larvae and offer parental care, giving this species an advantage and increasing survival of larvae through that critical period. As voracious eaters, snakeheads have the ability to consume insects, fish, birds and mammals, yet adults appear to lack any natural predators (ENSR International 2005).



Reproductive Strategy

Northern snakeheads are nest builders, and nests are typically circular in shape, 1m in diameter and located in vegetated areas. Northern snakeheads spawn between one and five times annually. Fecundity in the species ranges from 22,000 to 115,000. Eggs are pelagic, non-adhesive and yellow in color. Eggs hatch after 28 to 120 hours depending on temperature and the larvae are black. Larvae remain in the nest, guarded by one or both parents until the yolk-sacs are absorbed. Parents protect their young until they are approximately 18mm in length, when aerial respiration begins. At this point, juveniles develop fins and fend for themselves (ENSR International 2005).

Environmental Tolerances and Restrictions

The northern snakehead has the ability to survive a wide range of environmental conditions. They can survive in temperatures ranging from 0 to >30°C although optimum growth is achieved at 26°C (ENSR International 2005). An obligate air breather, the snakehead can survive out of water for up to four days by breathing oxygen (www.issg.org).

Preferred Habitat

Northern snakeheads prefer stagnant shallow ponds, swamps and slow moving streams with muddy substrates and vegetation. They can also be found in slow muddy streams and in canals, reservoirs, lakes, and rivers (www.fws.gov).

Distribution



(Courtenay, W.R., Williams, J.D. 2004)

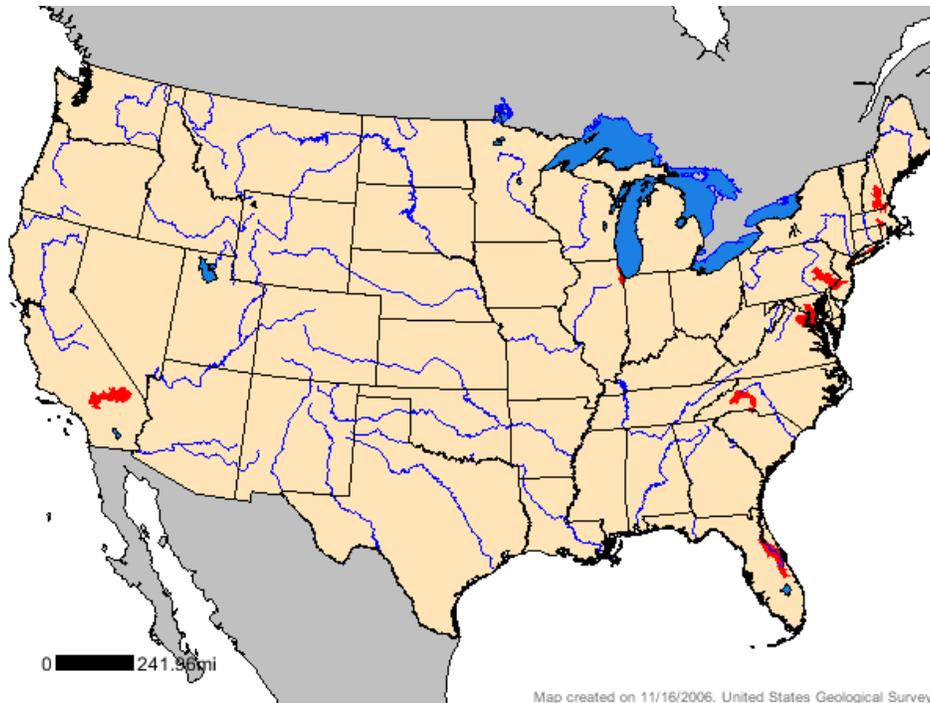
Native Range: China and Korea (ENSR International 2005).

China, the Russian Federation (the Ussuri River and the lower reaches of the Amur), and throughout the river systems of Korea except for the northeastern regions (www.issg.org).

Introduced Range: Non-native locations in China, Russian Federation, Japan, Kazakhstan, Turkmenistan, Uzbekistan and the USA (www.issg.org).

Established Range in United States

See map below. (www.fws.gov)



(2006 Northern snakehead distribution (in red). Image from USGS

Nonindigenous Aquatic Species website:

<http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=2265#imagemap>)

Current Status in Arizona

No occurrences of Northern Snakeheads exist in Arizona, except cursory observations at Asian markets. Snakeheads (all *Channidae spp*) are listed as Restricted Live Wildlife (R12-4-406).

Pathways

Aquaculture, hunting/angling/stocking, live food trade, pet/aquarium trade (www.issg.org).

Potential Impacts

Wildlife/Habitat

Snakeheads are voracious predators and compete with native species. They can eat prey up to 33% of their own body length with larger prey. Northern snakeheads are capable of surviving in water with very low oxygen content, giving them a competitive advantage over species such as pike and bass that require more oxygen (www.issg.org). The predatory nature of northern snakeheads indicates that their introduction would likely affect

other populations of fish, amphibians, and invertebrates through direct predation, competition for food resources, and alteration of food webs. Larger snakehead species are known to feed on birds (particularly young waterfowl), amphibians, small reptiles (snakes and lizards), and small mammals. Through predation, ecosystem balance could be modified drastically if northern snakeheads became established in waters with low diversity of native fishes and low abundance or absence of native predatory species (www.fws.gov). The northern snakehead is affected by parasites which are also known to affect native species (www.issg.org) and when a population is discovered, it is typically too late for eradication, unless the population is isolated. (www.fws.gov).



Infrastructure

None known.

Economic

The northern snakehead could potentially compete with commercially and recreationally important fish species through predation and competition for food and habitat in ponds, streams, canals, reservoirs, lakes, and rivers.

Human Health

None known.

Benefits

None. Could be considered a desirable sport fish and food fish.

Threats to Arizona

Due to the diet consisting of mostly fish, negative impact to native fish populations could be very high. Impacts to rare, threatened and endangered species could also be very high if snakeheads are introduced into a water body with listed species. Snakeheads may introduce parasites and disease to native and sport fish populations. Ecosystem balance and sport fish stocking regimes could be modified and/or negatively impacted due to establishment of snakeheads. Over time, an introduction could be detrimental to the sport fishing industry due to predation on sport fish (ENSR International 2005). Eradication would be nearly impossible and control efforts would be extremely challenging on our large reservoirs and/or limited riverine systems. Control in Arizona's smaller water systems would depend on vegetation, human access to the water body, and effectiveness of available control methods, such as rotenone.

Recommendation

Preventing and detecting the invasion of northern snakeheads starts with proper information and education of the public, especially since humans are the main vector for movement and transport of fish (ENSR International 2005). Once established, it is nearly impossible to eradicate this fish

species. Northern snakehead should be formally placed on AGFD Aquatic Invasive Species Director's Orders (A.R.S. §17-255).

References

Ecology of *Channa argus*

www.issg.org/database/species/ecology.asp

Courtenay, Walter R., Williams, James D. 2004 Snakeheads (*Pisces, Channidae*)-A Biological Synopsis and Risk Assessment. U.S. Geological Survey Circular 1251. Pp. 45-52.

ENSR International 2005. Rapid response plan for the Northern Snakehead (*Channa argus*) in Massachusetts. Massachusetts Department of Conservation and Recreation.

Northern Snakehead Working Group. Department of Interior. National Control and Management Plan for the Northern Snakehead (*Channa argus*).

<http://www.fws.gov/northeast/marylandfisheries/reports/National%20Management%20Plan%20for%20the%20Northern%20Snakehead.pdf>

