

MISSISSIPPI STATE
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Extension Service

Forest and Wildlife Research Center

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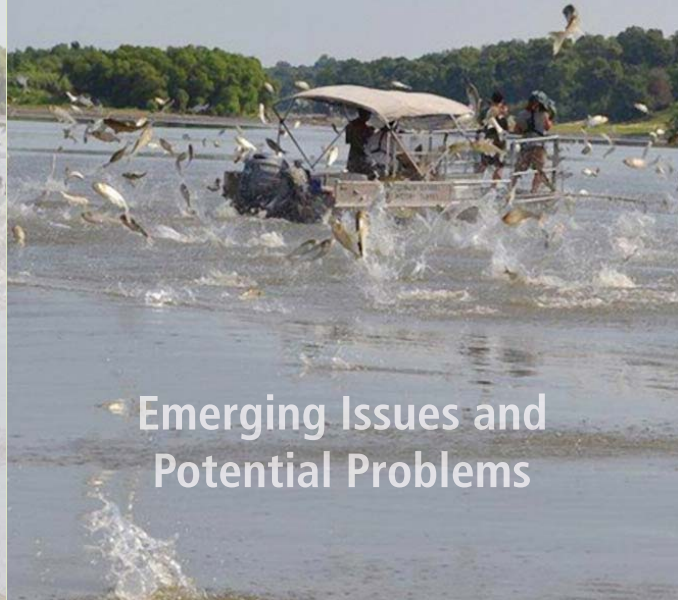
By **Andrew Smith**, Extension Associate Biologist, MSU Center for Resolving Human-Wildlife Conflicts.

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Publication 2891

Extension Service of Mississippi State University, cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914. GARY B. JACKSON, Director (500-06-15)

BIGHEADED CARPS IN MISSISSIPPI



Emerging Issues and Potential Problems

“Bigheaded carps” is a name assigned to a group of closely related fish that includes silver carp (*Hypophthalmichthys molitrix*) and bighead carp (*H. nobilis*).

Bigheaded carps were introduced into the United States in Arkansas in 1973 for biological control of phytoplankton in eutrophic (high-nutrient-level) water bodies. By the mid-1970s, silver carp were being distributed and raised at six state, federal, and private facilities for aquaculture production and biological control in manmade aquatic facilities (aquaculture ponds and sewage treatment lagoons).

They escaped confinement by dispersing into rivers and other water bodies during periods of flooding and now occur in many rivers in Mississippi.



Silver carp (top) and bighead carp.
Asian Carp Regional Coordinating Committee





BIGHEADED CARPS

Bigheaded carps are known to be present in these Mississippi rivers:

- | | |
|-----------------------------|--------------------------|
| 1 Big Black River | 7 Tombigbee River |
| 2 Big Sunflower | 8 Wolf River |
| 3 Coldwater River | 9 Yalobusha River |
| 4 Mississippi River | 10 Yazoo River |
| 5 Pearl River | 11 Yocana River |
| 6 Tallahatchie River | |

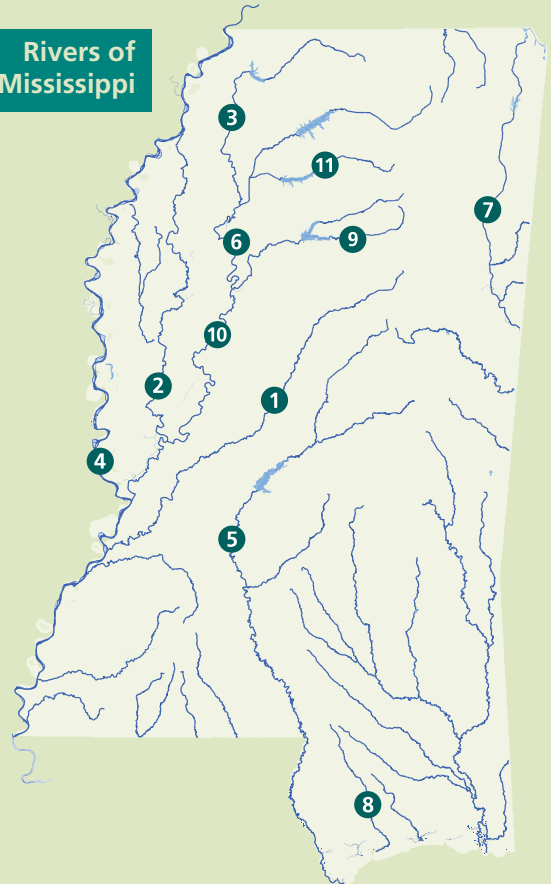
This map produced by the Department of Environmental Quality (MDEQ), Office of Land & Water Resources, Water Resources Management Division on May 28, 2015.

All map data is from the Mississippi Automated Resource Information System (MARIS) and MDEQ.

Map Projection: Mississippi Transverse Mercator

The Mississippi Department of Environmental Quality makes no warranties, expressed or implied, as to the accuracy, completeness, currentness, reliability, or suitability for any particular purpose of the data contained on this map.

Rivers of Mississippi





BIGHEADED CARPS

Their populations are increasing exponentially in some areas, allowing them to exploit our native fish and wildlife resources.

Silver carp are in 17 states.

Bighead carp are in 23 states.

Bigheaded carps are found in 29 states combined, as well as in Guam and Puerto Rico.



Silver carp.

Asian Carp Regional Coordinating Committee

Bigheaded carps are heavy-bodied, stomachless fish with scaleless heads and low-positioned eyes in proximity to the ventral surface.

Bigheaded carps are long-lived species. They can live about 15 years, with some reports of up to 20 years.



Bighead carp.

Asian Carp Regional Coordinating Committee



BIGHEADED CARPS

Sexual maturation for bigheaded carps typically occurs in 5-plus years in native waters of Southeast Asia, but in the United States, they have been observed to become sexually mature as early as 2 years.

In their nonnative waters of the United States, bighead carp are capable of reaching 100 pounds or more. Silver carp are capable of reaching 40 pounds or more.



U.S. Army Corps of Engineers Research and Development Center



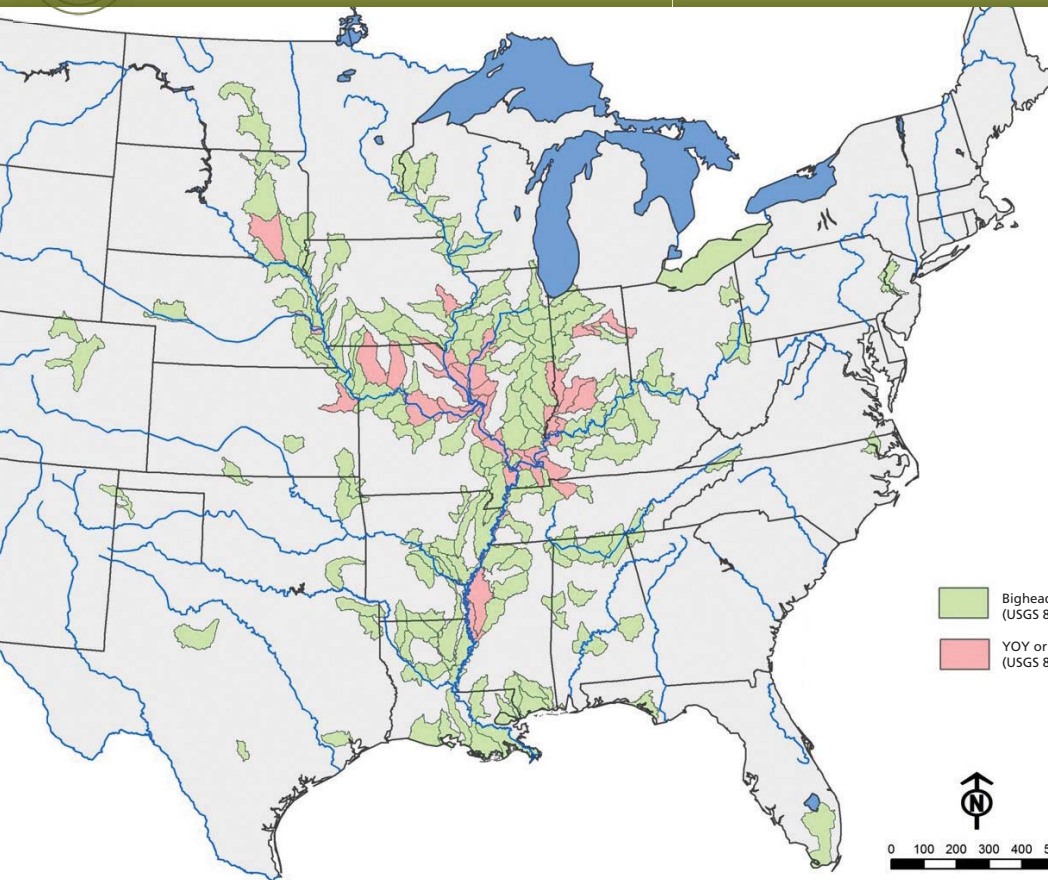
U.S. Army Corps of Engineers Research and Development Center

Although bighead and silver carp provide some benefits for aquaculture, their impacts on the environment far outweigh their benefits in many parts of the country.





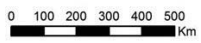


BIGHEADED CARPS



Distribution of Bighead and Silver Carp in the Mississippi River Basin

-  Bighead and/or silver carp (USGS 8-digit hydrologic unit)
-  YOY or eggs (USGS 8-digit hydrologic unit)



Data Sources: U.S. Geological Survey and Illinois Dept. of Natural Resources

April 2013



BIGHEADED CARPS

Environmental Impacts

Compete with native fish for food resources

Compete with native fish for quality habitat

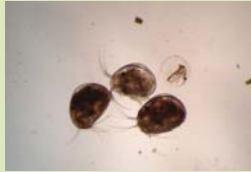
Lower water quality

These invasive fish species primarily feed on phytoplankton and zooplankton, the foundation of aquatic food webs. Planktivorous (species that exclusively feed on plankton) species found to be negatively affected by bigheaded carps include:

gizzard shad

bigmouth buffalo

American paddlefish



Microscopic plankton in the lab.
Andrew L. Smith



Because all native fish depend on plankton during some stage of their life cycle, bigheaded carps can adversely affect all native fish.

The diminishment of this resource could have serious consequences for all native fish species, as well as the wildlife that depend on these species.

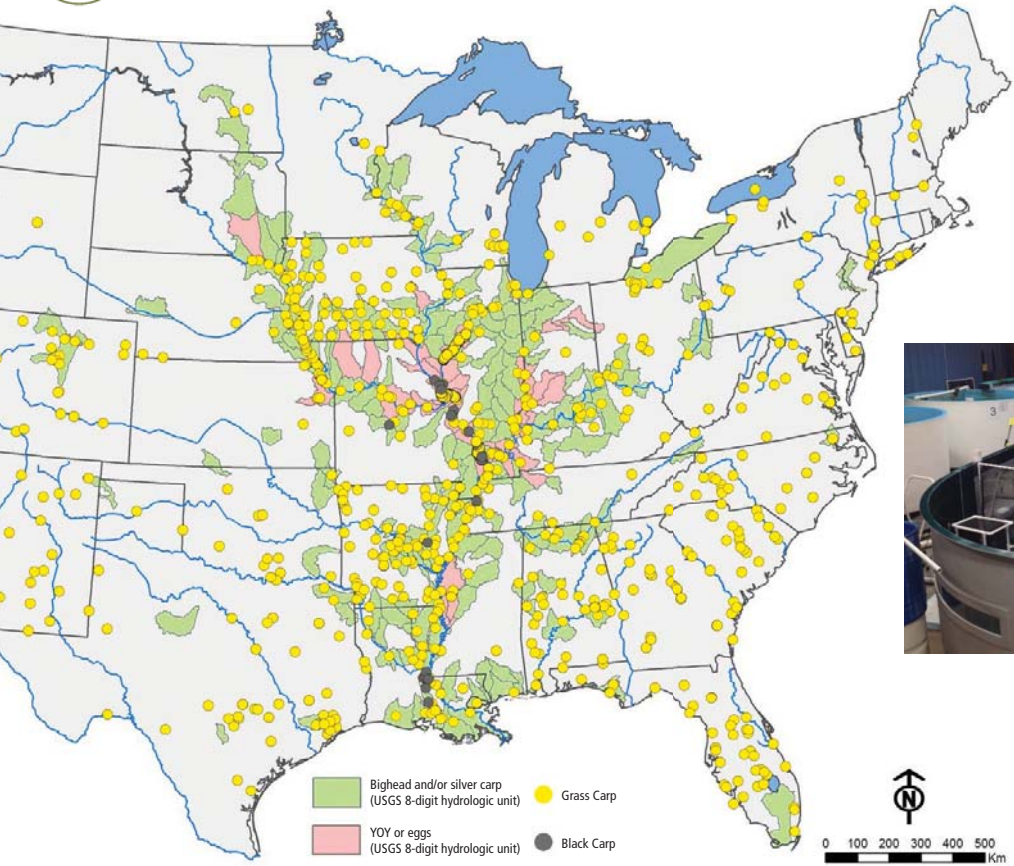


Silver carp gill rakers.
Asian Carp Regional Coordinating Committee

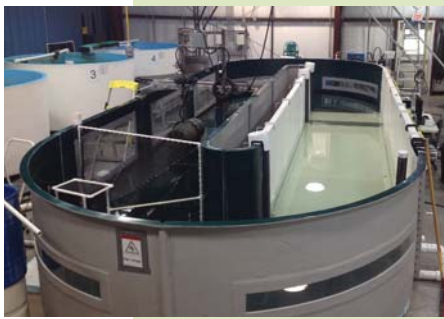
American paddlefish.
*U.S. Army Corps of Engineers
Research and Development Center*



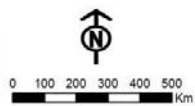
BIGHEADED CARPS



Distribution of Bighead and Silver Carp in the Mississippi River Basin – including capture locations of both black and grass carp individuals



Electric dispersal barrier being tested at the U.S. Army Corps of Engineers Research and Development Center.
Andrew L. Smith



Data Sources: U.S. Geological Survey and Illinois Dept. of Natural Resources

April 2013



BIGHEADED CARPS

Bigheaded carps spawn in rivers in the spring and early summer during periods of high water. However, these species may exhibit protracted spawning into late summer (August and September).



Silver carp eggs.
*U.S. Army Corps of Engineers
Research and Development
Center*

The eggs of bigheaded carps are laid and cast in turbulent waters, where the eggs develop while drifting downstream. The eggs are slightly negatively buoyant and must be held in suspension by water current or they will settle on the bottom, where they are believed to perish.

Bighead and silver carps exhibit (under optimal conditions) extremely rapid development, allowing them to grow quickly and lessening mortality during the juvenile stages when they are most vulnerable to predation.

There are few natural predators of these carps in North America. This is a contributing factor to the success of their invasion.

However, some native predatory fish such as largemouth bass, blue catfish, and channel catfish do prey on bigheaded carps. Native birds such as pelicans and herons may also use juvenile bigheaded carps as a food resource.



Juvenile silver carp exhibit strong schooling behavior from fright reaction in the lab.
Andrew L. Smith



BIGHEADED CARPS

Implications for Public Health and Safety

While other invasions typically threaten human safety indirectly by being vectors for disease and other pathogens, this invasion is unique in that it presents a direct threat to human safety.

Silver carp pose a serious and direct threat to recreational boaters and fishermen by causing animal-vehicle collisions. These fish, when stimulated and frightened by boat engines, leap up to 10 feet out of the water and can collide with humans.

Documented injuries to people include broken bones, cuts from fins, concussions, and back injuries.

Boaters *may* encounter less silver carp after reaching speeds of 30 miles per hour.

Bighead carp are more languid and typically do not leap from the water like silver carp.

Because of their threats to human safety, all silver, bighead, black, and largescale silver carp have been declared injurious species under the Lacey Act.



Silver carp pose a serious threat to public safety.

Asian Carp Regional Coordinating Committee



Diseases and Parasites

Silver carp carry 91 known pathogens (bacterial, viral, fungal, protozoan, trematodes, and cestodes).

Health risks to humans include *Listeria monocytogenes*, *Clostridium botulinum*, *Aspergillus flavus*, *Alternaria*, *Penicillium*, *Fusarium*, and *Salmonella* sp.

Bighead carp carry 46 known pathogens. Some of these pathogens are zoonotic (transmissible to humans) and can be transmitted to native fish fauna of Mississippi.

High-density schooling behavior is a highly favorable condition for the spread of many diseases and parasites.

Economic Impacts

Economic impacts of invasive fish can be huge. For example, economic impacts of nonnative fish in the Great Lakes exceed \$5 billion per year.

The economic consequence of bigheaded carps in Mississippi may include reductions in game fish populations, which would result in lower-quality fishing experiences. In addition, higher risks associated with outdoor-water recreation could lower consumer expenditures and license sales.

Data to quantify the exclusive economic impacts of silver and bighead carp are lacking.



TAKE ACTION

Help Solve the Problem!

Never release or translocate silver or bighead carp into other bodies of water.

Help educate others about the negative impacts of bigheaded carps and the threats they pose.

Increase state and national efforts to collect and report more accurate quantitative data on the economic impacts of the bigheaded carp invasion.



Carp exercise.
Asian Carp Regional Coordinating Committee



Black carp in the lab.
U.S. Army Corps of Engineers Research and Development Center

Contact your local Mississippi Department of Wildlife, Fisheries, & Parks office to report any cases of bigheaded carps you suspect in new areas (rivers, streams, or reservoirs

not mentioned earlier). You may also contact Andrew L. Smith with the Mississippi State University Extension Service at als756@msstate.edu for more information or to report new cases of bigheaded carps.

Additional Resources

www.humanwildlifeconflicts.msstate.edu

www.asiancarp.us

www.nas.er.usgs.gov

www.invasivespeciesinfo.gov/aquatics/asiancarp.shtml

www.mdwfp.com