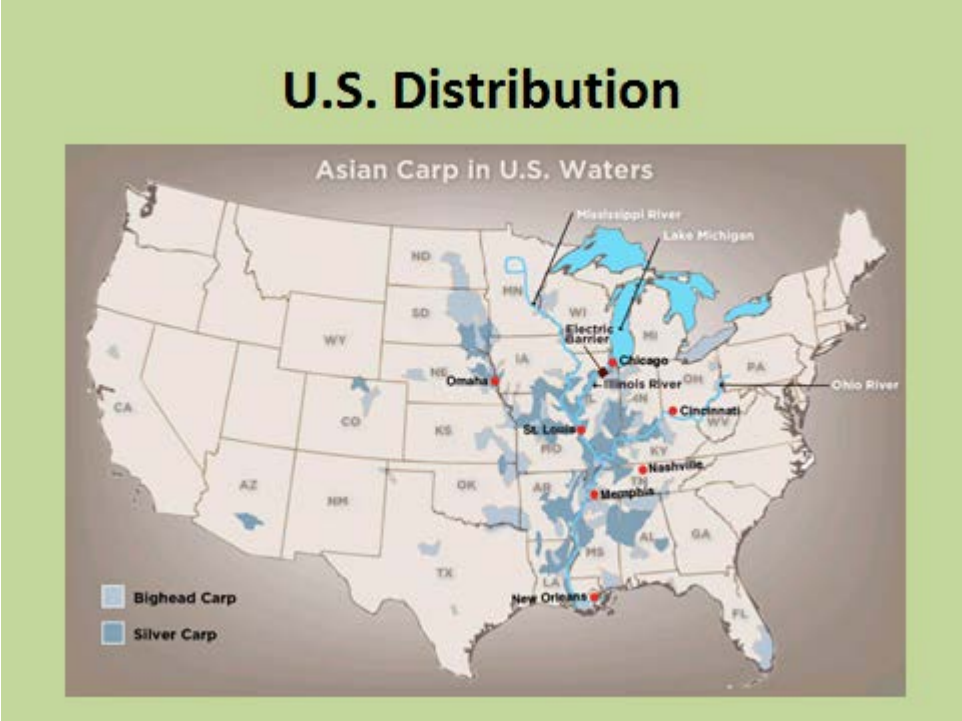
ASIAN CARP IN TENNESSEE

What are they?

There are actually four species of Asian carp in the United States and in Tennessee. All are from the Yangtze and Amur River systems in China. They were imported into the United States for various aquaculture purposes back as early as 1970. They were unintentionally introduced into the waters of our country when they escaped from aquaculture ponds in the delta areas of the Mississippi River during the extreme floods in the late 1980's and early 1990's. The grass, bighead, and silver carp all arrived in Tennessee waters by migrating through the locks at Kentucky and Barkley dams. All four affect the fish and aquatic life in numerous ways.



Black carp - This species of Asian carp eats snails and mussels. It was brought into the U.S. to control snails in catfish ponds. Snails serve as a host for parasitic worms that get into the flesh of fish thus making catfish meat unappealing. Getting rid of the snails eliminates the parasitic worms. Black carp are problematic because they could eat the many species of snails and mussels that are native to Tennessee. To date only 5 black carp have been reported and all were from the Dyer and Lake county sections of the Mississippi River. A 70 pound black carp was caught by a commercial fisherman in the mouth of the Obion River on the Mississippi River in 2012.

Black carp

Grass carp - Grass carp, also know as White Amur, eat aquatic vegetation. It was brought into the U.S. to control excess aquatic vegetation (weeds) in catfish ponds. Grass carp are a concern because they eat many types of aquatic vegetation and much of this vegetation provides excellent cover for a variety of sport fish such as largemouth bass, crappie, and bluegill. Many species of aquatic vegetation also provide food for waterfowl. Reproductively sterile grass carp are commonly used to manage aquatic vegetation in small lakes and are legal to stock in private lakes and ponds as long as they are sterile. Grass carp can reach sizes in excess of 80 pounds.

Grass carp

Bighead carp - This species of Asian carp eats microscopic zooplankton. Zooplankton is an important part of the diet for many native fish such as shad, buffalo, and paddlefish. Larval sport fish such as crappie, bass, and bluegill also depend upon zooplankton in their early life stage. Bighead carp are problematic because they compete with our native species of fish for food and space. Bighead carp can grow as large as 100 pounds.

Bighead carp

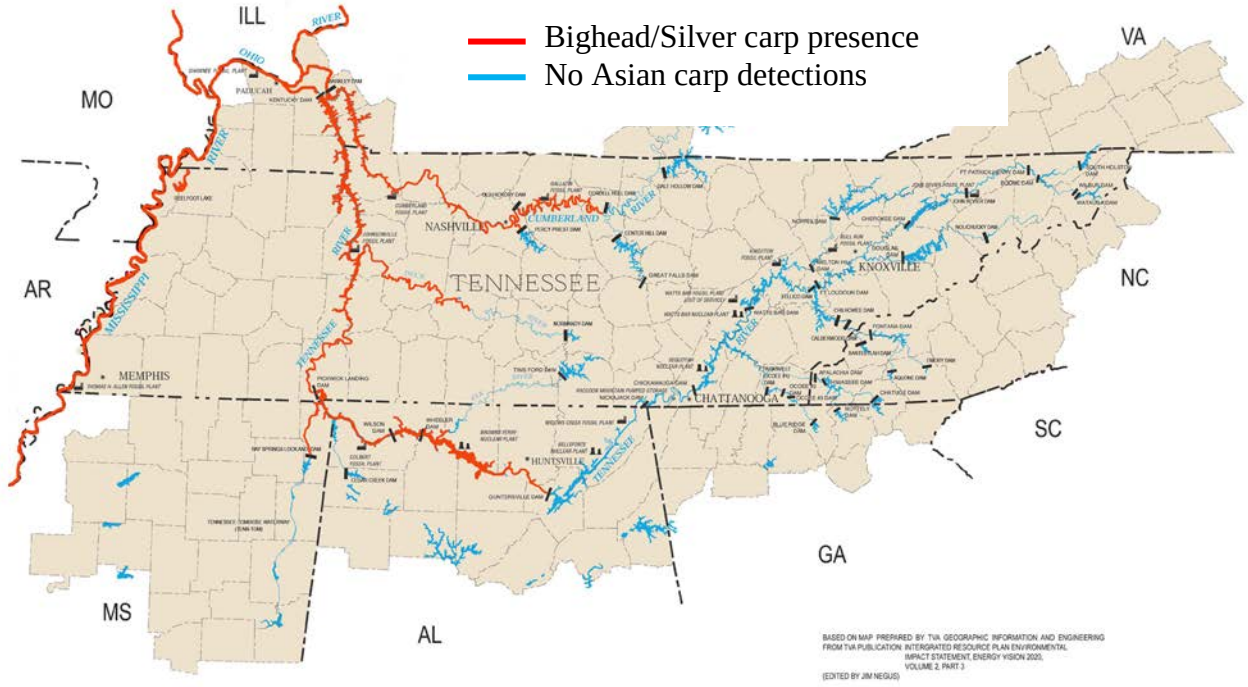
Silver carp - This species of Asian carp eats microscopic algae and zooplankton. They are problematic for the same reasons as mentioned for the bighead carp. They compete for food and space with our native species. In addition, when silver carp are startled they have a tendency to leap out of the water. They can jump as high as 8 feet. Therefore they are even more problematic because of the potential to injure boaters, jet skiers, and water skiers. Silver carp can grow as large as 60 pounds.

Silver carp

Silver carp jumping

Where are they in Tennessee waters?

The black carp has only been found in the Mississippi River thus far. Grass carp have been found in all reaches of the Cumberland, the Tennessee, and the Mississippi Rivers. The state record bighead carp was caught in Guntersville Lake but we have received reports of bighead carp as far up the Tennessee River system as Watts Bar Lake. One was also reported from Old Hickory Lake. Silver carp have migrated as far as Old Hickory Lake in the Cumberland River system and as far as Wheeler Lake in the Tennessee River system.



Why should we be concerned?

You have probably seen the funny videos of silver carp jumping into boats and hitting people on the Illinois River. All is not so humorous when someone gets hit by a 25 pound silver carp while traveling 30 miles an hour in a boat. In addition, native fish species have been reduced and in some places replaced by bighead and silver carp in parts of the Illinois River. Although the numbers of bighead and silver carp are not nearly as abundant in Tennessee, the potential is there for that to happen.

An emaciated paddlefish from an oxbow lake in Kentucky that had an abundance of Asian carp

Silver carp jumping into a boat

What can be done?

Currently there is a great deal of research that has been funded by the federal government to keep Asian carp out of the Great Lakes. Methods such as electric barriers, water cannons, carbon dioxide injected into water, sound barriers, and other devices are being tested in the upper Illinois River near the entrance to the Great lakes by way of Lake Michigan. Other research ideas include genetic manipulation so that all offspring will be males, development of a toxin that will only kill Asian carp (no luck yet), and possibly the use of diseases that will only affect Asian carp (no luck here either). One method that may be effective is the use of commercial fishing to remove Asian carp from infected waters. This method can be used to thin out heavy populations of Asian carp as well as stop the advancement of "the leading edge" of silver and bighead carp into areas where they have not yet become established.

Commercial harvest of bighead and silver carp

What is being done in Tennessee?

To date, most of the efforts related to Asian carp have been directed towards monitoring the population, development of posters, signs, and wallet cards to make people aware of Asian carp, and meeting with other states and experts to determine methods for controlling them. Tennessee Wildlife Resources Agency (TWRA) also produced a video with Bill Dance to make people aware of Asian carp and the dangers of transporting them to other waters. Click on this link to watch the 6 minute video: http://asiancarp.org/BillDance.asp

We have also posted signs at boat ramps and handed out Asian carp "watch cards" to marinas and fishing organizations to make people aware of their presence . In our live bait regulation, we made it illegal to transport live Asian carp in Tennessee in an effort to prevent further distribution.

The TWRA is working with the Alabama Department of Conservation and Natural Resources, the Mississippi Department of Wildlife, Fisheries, and Parks, and the Kentucky Department of Fish and Wildlife to try to find ways to manage and control Asian Carp in both the Tennessee and Cumberland River systems. Recently these states assisted the U.S. Fish and Wildlife Service in trying to determine the "leading edge" of silver and bighead carp in the Tennessee River System. They used environmental DNA (eDNA for short) surveillance to determine this. eDNA provides information about whether Asian carp DNA is present in water samples.

Asian carp are notoriously difficult to find in waterways if the population density is very low. The eDNA technique is much more sensitive than other standard fishery sampling gear, and is useful for early Asian carp DNA detection and to identify distribution patterns of DNA when the fish are low in abundance. A positive eDNA result tells researchers if Asian carp genetic material is present in an area. Once eDNA is detected then that area may be a good place to use other sampling tools, such as netting, to look for signs of live Asian carp. In the Tennessee River system, test results indicated the presence of silver and bighead carp eDNA in Pickwick, Wilson, and Wheeler reservoirs (biologists already know that they are present in Kentucky reservoir so they did not test there). The "leading edge" appears to be in Wheeler reservoir in Alabama. eDNA samples will be conducted in the Cumberland River system in the near future.

PROPOSED MANAGEMENT AND CONTROL OF ASIAN CARP

Our primary goals are to stop the advancement and reduce established populations of Asian carp. Currently, Asian carp are present in the Mississippi, Tennessee, and Cumberland Rivers. The Mississippi is so vast that for now, most of the management and control efforts will focus on the Tennessee and Cumberland River systems.

The Leading Edge

Even though there have been reports of a few bighead carp as far upstream as Watts Bar Lake, the current leading edge of Asian carp have been determined to be as far upstream as Guntersville Reservoir in the Tennessee River system and as far as Old Hickory Lake in the Cumberland River system. The proposal is to promote commercial harvest in concert with deterrents placed on dam locks (e.g., noise generators and CO_2 bubble screens) to prevent further advancement of these fish.

Established Populations

TWRA proposes to use commercial fishing methods to remove large volumes of bighead and silver carp in established populations such as Kentucky, Barkley, and Cheatham Lakes by (a) Utilizing the knowledge of fishermen (sport and commercial) to identify areas where Asian carp are plentiful and remove them by catching them in commercial fishing tackle, and (b) by tagging them with an acoustic tag and then tracking them. Silver carp tend to stay in large groups so biologists could track the tagged fish to larger groups of silver carp. Biologists or commercial fishermen could then set nets in areas of known silver carp concentrations and remove them.

Needs

- **Fish Processing Plants -** The only plus side to Asian carp is that their flesh is very mild and is thus considered very tasty. There is a demand for Asian carp for various uses such as fish meal, fertilizer, and human consumption (whole fish, filets, minced). There is a high demand for processing Asian carp into surimi (also known as artificial crab meat). Currently there are no major Asian carp processing plants in Tennessee but three are located in Kentucky and one is located in Mississippi. There are several smaller wholesale fish markets that process Asian carp but only on a limited basis. Despite this interest, few commercial fishers fish for Asian carp. They may have to travel out of state to sell their fish to processing plants. This travel reduces profits and the incentive to harvest Asian carp.

- **Price per pound for Asian carp -** Even if there were Asian carp processing plants, commercial fishermen might not harvest them if the price per pound of fish is not high enough to make it worthwhile. Currently prices vary from 3 to 5 cents per pound for Asian carp that are processed into fish meal and/or fertilizer and from 8 to 12 cents per pound for fish processed for human consumption. According to comments from commercial fishermen the price per pound needs to be around 15 to 20 cents per pound to make it feasible. For comparison, the price per pound for buffalo is around 25 cents per pound and for catfish it is around 60 cents per pound.

- **Funding:** Not including the processing plants, funding is needed for subsidies and research.

  TWRA would like to provide subsidies as an incentive to harvest Asian carp. These subsidies would be needed to reach the 15 to 20 cents per pound necessary to make the commercial harvest of Asian carp profitable for fishers.

Research is needed to determine Asian carp movements. Some researchers are using telemetry to track tagged Asian carp to better understand their habits. These acoustic tags and tracking devices are very expensive. And as mentioned previously, silver carp tend to travel in groups or pods and some of the tagged fish can be tracked to the group and be removed by commercial fishermen as well as by agency personnel.