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Sustainable Solution for Asian Carp in the United States: Turning “Trash Fish” To “Treasure Dishes”: A Case from Two Rivers Fisheries

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Asian carp, which are widely distributed in Asia and Europe, are nutritious and popular with consumers. However, they are considered aggressive invasive species that have threatened rivers, lakes, and native species in the United States over the last decades. In recent years, several state governments along the Mississippi River have implemented programs to eliminate invasive Asian carp, but these did not alleviate the threat. We propose that turning “Trash Fish” into “Treasure Dishes” might be a sustainable solution for Asian carp compared to eliminating them. We explore the possibility of Asian carp as food fish on American tables through Carp Solution, which focuses on reducing, reusing, and redefining Asian carp by industrializing it. In addition, suggestions and possible utilization methods were proposed to improve the negative impression of Asian carp in the United States.

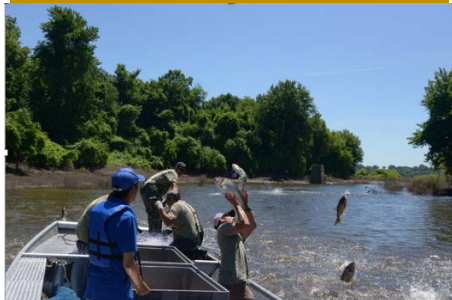
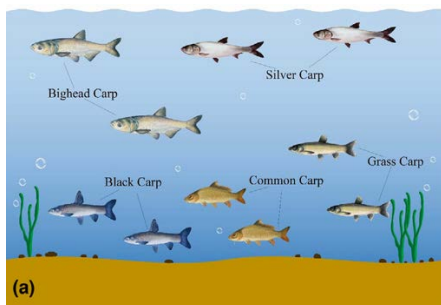
Introduction

Asian carp were introduced to the United States to solve algae blooms in rivers and lakes in the 1970s (Kolar et al., 2007). Unfortunately, Asian carp have no natural enemies in the local ecosystems, and the rate of reproduction soared. Due to flooding, Asian carp entered the Illinois River, and the

Mississippi River Basin (Garvey et al., 2015). According to a risk assessment by the U.S. Geological Survey (USGS) in 2020, Asian carp have established dense populations in the Mississippi, Illinois, Missouri, and Maumee River. The term “Asian carp” includes bighead carp, silver carp, grass carp, black carp, and

common carp (Alsip et al., 2019; Ivan et al., 2020).

They proliferated greatly and spread throughout rivers, ate tons of plankton on which most native fish relied, reduced water quality, and severely threatened the survival of other species in waterways. Asian carp also have incredible jumping ability, jumping an average of 2.1 m over, which poses a threat to people who are boating, water skiing, or fishing (Schankman, 2015; Vetter et al., 2017).



The U.S. government has spent hundreds of millions of dollars to study and prevent the spread of Asian carp, which included capturing them with electric barriers and water guns (Garvey et al., 2015; USACE, 2010). However, the spread of Asian carp in the Mississippi River is still serious, and the current solution cannot solve the problem fundamentally.

Two Rivers Fisheries

While the increasing population of Asian carp poses a problem in the Mississippi River ecosystem, there is a market that exists in other countries where fish is a delicacy. Two Rivers Fisheries, established in 2012 in Kentucky, processes and exports varieties of Asian carp from the Mississippi River and nearby tributaries— turning an environmental problem into an exporting opportunity.



Two Rivers Fisheries contracts with local commercial fishing businesses. The company receives fish harvested from the Mississippi and Ohio Rivers, as well as Kentucky Lake, Lake Barkley, and other Western Kentucky waterways. Two Rivers is now the largest U.S. exporter of Asian carp, shipping its products to nearly a dozen countries in Asia, Europe, the Middle East, Africa, and the Caribbean. As a result of those exports, the company has created new markets for local fishermen near the company's headquarters. The company processed

over 500,000 pounds of Asian carp in 2013 and has doubled its production each year. To date, they have processed over 23.2 million pounds of fish, opened a fish market, and diversified into other products. However, COVID-19 and shipping costs presented a major challenge to the export business.

Challenge and Strategies on Carp Solution

Due to the pandemic and freight cost, Two Rivers Fisheries have to suspend exports and start to explore the domestic market. To grow the company's proposed fish businesses in the domestic market, Two Rivers Fisheries has established a strategic partnership with the Arise Veteran Foundation and the Native American community along the Mississippi and Ohio River, Located in Golconda Illinois. AVF will be working closely with the University of Illinois Extension program located at Dixon Springs on the development of agricultural bi-products from the Asian carp.

The mission of the Arise Veteran Foundation is to empower veterans and equip them to serve and work in their communities. They are developing programs to house, train, and incubate new businesses, and help companies recycle materials for sustainability and creative projects. Partner with Two Rivers Fisheries, veterans be able to find jobs either in the company or join local commercial fishing business after Arise Veterans Foundation provides specific skills training. It is a win-win strategy in

that the company has a sufficient workforce and veterans can build their careers in the industry.

For many centuries, Native American tribes have relied on hunting and fishing for subsistence and trade. Fish could be smoked or dried to be stored and traded in large quantities. Fish constituted a major portion of most Indians' diets. In partnership with Two Rivers Fisheries, the Native American community will set up fishing groups to provide Asian carp to the company and also can process the fish to prepare them as a dish for the Casino restaurant.

Through those partnerships that were formed, a vision is being developed for the invasive carp that started hitting the Mississippi and Ohio rivers. It needed to do something to combat this invasive species. There are some economic development opportunities with the fish being explored by the Illinois Department of Natural Resources in this area. With a sufficient workforce from the Arise Veteran Foundation through harvesting Asian carp from the Native American community, Two Rivers Processing Plant can supply all the fish products for the domestic market and global market, products include fresh fish, meatballs, fish cake, dumplings, sausage, salt fish, dried fish, fish fertilizer, pet food, bait, and fish bone crafts.

Fish sausage, fish dumplings, fish cakes, salted fish.

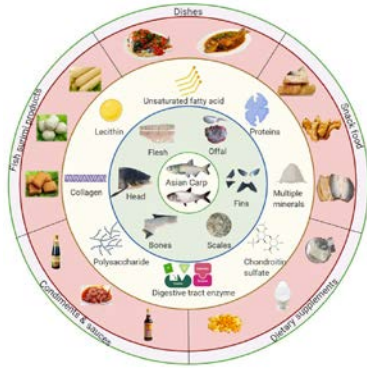


Public education on the attitude of American consumers toward Asian carp

The Chinese have accumulated a wealth of experience on how to eat Asian carp because of the long tradition of food culture. Almost all parts of the Asian carp can be used to make tasty dishes. Due to food culture differences, the perception of Asian carp differs greatly between Chinese and Americans. The biggest obstacle that prevents Americans from consuming Asian carp is the misconceptions and prejudices toward Asian carp. Due to the media that has focused on Asian carp as an invasive species that damages local ecosystems, Americans have developed a negative attitude toward Asian carp. The lack of media coverage of the nutritional and food values of Asian carp, and the lack of necessary education about Asian carp, have contributed to this negative image. Many experts have proposed some solutions to this problem. Varble and Secchi (2013) proposed that education should be a key part of the marketing campaign for invasive species so that people are fully aware of Asian carp as a potential food source. According to the study by Morgan and Ho (2018), knowledge and perception of carp were poor, and food neophobia (fear of new foods) scores were above average. Less

than 15% of respondents had eaten carp, but nearly 53% were willing to try. Varble and Secchi (2013) found similar results, as over 70% of their subjects were willing to try a sample of Asian carp and 68% were willing to purchase it in grocery stores. However, at present, little information exists on public demand. Hence, redesigning and rebranding Asian Carp is an important way to change the attitudes of Americans towards Asian carp.

Asian carp have huge potential as a food source for human consumption in the United States (Keevin & Garvey, 2019). China is experienced in processing Asian carp, so they can help to process Asian carp into a variety of Asian carp products, such as frozen products, fish burgers, nuggets, dumpling fillings, dry-cured products, snacks, and canned goods. They could be produced and sold in the United States. Due to its high content of protein, fat, and many minerals, Asian carp is often used to make a variety of dietary supplements. High-quality fishmeal has high protein digestibility and high amino acid content and is a good source of pet food and feed, it also be used in soil fertilizer, foliar fertilizer, and other possibilities. In addition to the domestic market, the international market is awaiting the U.S. Asian carp products.



Renaming Asian carp, instead of using their original names, might reduce the negative image of them too. Some species were renamed because their original names were deemed inappropriate or offensive. Keevin and Garvey (2019) suggested that the silver carp be renamed Silver Fin (the trademark name currently used in the culinary world) and bighead carp be renamed Bighead to reduce the negative brand image of these two Asian carp.

In addition to the negative image of Asian carp in America, the safety of the product is also a concern for Americans. Thurner et al. (2014) collected a variety of species of fish in the Wabash River and the Tippecanoe River and found fewer parasites and bacteria in bighead carp than most native species. Asian carp are safe for consumption and, hence, they are a common food in many countries in Asia and Europe. There are many laws and regulations regarding the safety of Asian carp in these countries. The United States can establish its laws and regulations for Asian carp to ensure the safety of this potential food supply.

Conclusion

Successful utilization of invasive Asian carp in the United States will not only allow Americans to consume a variety of delicious Asian carp products but also effectively mitigate the Asian carp menace while providing jobs to local communities to generate significant economic value.

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