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**Illinois Department of Natural Resources
Asian Carp Business Process Analysis
Final Report and Action Plan**

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EXECUTIVE SUMMARY

The *pernicious invasion of Asian carp has presented a problem for mid-western states for decades with spread of these fish seemingly impossible to stop*. With numerous government efforts affecting only the most critical areas, it is apparent that *greater resources must be devoted* to controlling the proliferation of this invasive species. *Novel, broad-thinking approaches are needed to effect marked change*. To this end, a broader, multi-state effort has begun to manage and control Asian carp populations by addressing source populations. In this context, Illinois Department of Natural Resources (IDNR), with support from U.S. Environmental Protection Agency (EPA), hired Tetra Tech, Inc. (Tetra Tech) and tasked them with developing innovative ways to control carp populations and to dramatically reduce their numbers.

Turning the problem on its head, Tetra Tech outlines in this Final Report and Action Plan *how the challenge of Asian carp abundance can form the solution to their control; how private sector and market forces can be expanded in creating desirable products for domestic and international markets to drive removal of the fish*. The goal of this effort is the removal of 20 million to 50 million pounds of Asian carp per year from Illinois waterways, *focused on achieving maximum effect on established populations in strategic locations*. Consistent with multi-state Asian carp management goals, these figures are derived from current, robust population data and population models including hydroacoustic research conducted by Southern Illinois University. While centered on the State of Illinois, proposed actions in this report are intended to be *replicable in other states and throughout the mid-west to provide coordinated, effective control of Asian carp*.

To further benefit the approach, employing profit motive to control Asian carp populations also *requires fewer governmental dollars and resources*, and provides *positive economic spinoff*. Establishing new and expanding existing fish processing enterprises, and the fishers who supply them, stimulates local and regional economies through *creating employment; potentially tapping underutilized real estate; providing much needed tax revenue to localities, states, and federal government; and most importantly enhancing workers' lives through gainful employment*. Without sustained, long-term commitment the task of stopping the spread of Asian carp and reducing their populations becomes overwhelming.

Methodology

The study began with a business process analysis to identify gaps and barriers that impede Asian carp-related business development. It involved gathering and reviewing approximately 40 articles, papers and reports about Asian carp populations and businesses developing or currently selling carp products. The consultant team conducted in-depth interviews with 36 stakeholders from a wide variety of government agencies, universities, fish processors, and fishers; and assembled a compendium of nearly 40 federal, state, regional, local and university/nonprofit resources to support small businesses. Following synthesis of this information, the team summarized findings and presented them to a Steering Committee of key stakeholders involved in Asian carp control (discussed below), and together developed recommended actions. The Tetra Tech team then provided cost estimates, implementation timelines and measurement metrics for each recommended action.

To guide the analysis and its recommendations and to provide support for its implementation, a Steering Committee composed of eight stakeholders was assembled. Members included a high-level group of decision-makers from a cross section of federal, state, and local governments; and from nonprofit and educational institutions. The Steering Committee and the consulting team worked cooperatively throughout the study with the Asian Carp Coordinating Committee (ACRCC), the lead multi-state coalition managing Asian carp control.

Findings

Findings identified through the research were summarized by 12 thematic categories presented in the chart below, followed by brief discussion of each.

Categories of Findings	
❖ The Fish (<i>qualities</i>)	❖ Regulatory
❖ Asian Carp Products	❖ Chinese and Other International Markets
❖ Fishers	❖ Information Sharing
❖ Processors	❖ Business Development
❖ Transportation	❖ Funding
❖ Marketing	❖ Potential Solutions

The Fish American consumers are cited as having a misguided impression that Asian carp are “trash fish,” implying that they have a fishy flavor, a tendency toward contamination, and they are bony. In fact, this impression could not be farther from the truth. Public tasting events have shown that American consumers are typically impressed by the “pleasant, mild flavor” of the fish, and that boniness can be solved with new deboning technology or is simply not an issue for ethnicities accustomed to bone-in fish.

Asian Carp Products Research has shown that there are clearly markets for Asian carp and carp products, including in the commercial food industry, restaurants, fish sticks, hot dogs, jerky, smoked fish, dietary supplements, surimi (fish paste), pet foods, fishmeal, leather, fertilizer, and others. A handful of carp product producers have successfully started and are currently in operation. These producers have cultivated their respective markets, taken the risk of starting a business, and have the sales to prove that Asian carp sells. Several are poised to expand.

Fishers are a critical component to any business venture involving Asian carp. However, in Illinois and other mid-western states, there has been a significant decline over decades in the number of commercial fishers. As of 2016, IDNR suggests only 40 of 967 licensed commercial fishers were significantly engaged in commercial efforts within the state (catching over 25,000 pounds). In the same year, only 12 reported catches of Asian carp over 100,000 lbs. Note: a commercial fishing license enables a fisher to use hoop nets or other

commercial gear to catch fish. Some use their fish for personal use (not all commercial fishers are engaged in selling their catch).

Not only is commercial fishing a physically difficult profession, it is a low-margin business. This is particularly true for Asian carp catches which do not command the prices in the marketplace (10 cents per pound, as of this writing) of more popular species (25 to 50 cents per pound).

Processors Like fishers, processors face formidable challenges in reliably incorporating Asian carp into production streams. Supply, quality, and lack of processing infrastructure are the major inter-related challenges identified. Continuity of fish supply is lacking due to a dearth of connections with fishers and, when available, processors have noted some quality and spoilage issues. Quality issues appear to be related, at least in part, to underdeveloped infrastructure systems, such as logistical challenges with cooling needs and transportation.

Transportation Currently, commercial fishers are responsible for fishing and transporting their catches to processing facilities. The additional time, financial, and logistical challenges associated with catch-and-transport activities are a disincentive to fishing Asian carp and may contribute to decreasing fish quality. Transportation solutions are vital to establishing better fisher/processor connections and, therefore, the long-term viability of any Asian carp-related business.

Marketing Efforts to communicate the positive qualities of Asian carp – pleasant taste, health benefits, reducing invasive species populations, low contaminant levels, and consuming fish caught from clean waterways – will be fundamental in changing current perceptions of Asian carp. A branding effort for consumer markets may be a potentially game-changing opportunity to recast how the fish is perceived.

Regulatory While several regulatory challenges were identified – transport across state lines, environmental regulations, use of nets and fishing methods not currently permitted – regulatory agency representatives indicated their willingness to work with fishers to clear challenges and hurdles.

Chinese and Other International Markets Regulatory and economic development agencies in the region receive frequent inquiries from international (particularly Chinese-based) ventures. However, the majority of these inquiries lack an appropriate level of preparation to be considered viable. Additionally, the volume of fish required for many of these inquiries is beyond the current capabilities of the Asian carp supply chain and will require significant cultivation. An entity experienced in exporting fish to China and a subject matter expert (large fish processor) with experience in China may need to be identified before any significant exports to China are feasible. Subject matter experts for exporting to other countries also are needed.

Information Sharing In general, communication barriers exist that inhibit business development opportunities for Asian carp. When information is available, it is often outdated and incorrect. There is a need for current, fact-based information from which fishers and investors can understand the biology of the species and determine which populations are best suited for significant harvests. From the fishers' perspective, there is a lack of information about where best to catch Asian carp that perhaps electronic solutions such as website and/or phone apps can help to address.

Currently, a model is being developed by the U.S. Fish and Wildlife Service (U.S. FWS) that includes an evaluation of the effects of focused, intensive commercial fishing to prevent further migration and lower impacts of Asian carp populations within upstream and downstream river stretches and navigation pools. Coordinating with fishers on collection, analysis, and flow of up-to-date information on number and location of Asian carp would support increased catch efficiency and scientific evaluation of the influence of fishing on overall population dynamics in pursuit of broader management goals.

Business Development Many of the issues discussed in previous categories are symptomatic of an uncoordinated approach. The industry needs a solid management team of experts with hands-on experience to oversee the implementation of business development. Ideally, team members with economic development experience would be involved throughout the life of the project.

Funding Funding was repeatedly identified as a challenge during the stakeholder interviews. The most reliable, long-term option for securing funding is to increase the cost of fish per pound to a level where both the fishers and the end users are able to make a profit.

Potential Solutions A variety of solutions was suggested, including 1) additional funding and grants for fishers; 2) a tax break or subsidy; 3) improved transportation logistics; and 4) connecting fishers to processors by creating a private company that buys from fishers and sells to buyers similar to a proposed public-private partnership in Kentucky. These were considered along with other solutions to identified issues and a set of Action Recommendations was advanced.

Conclusions and Recommendations

Eight key recommendations were developed to address the gaps and barriers that impede Asian carp-related business growth.

One of the more important recommendations is **to create an incentive program** to address Asian carp's low sale price to processors. Addressing this price gap is expected to attract existing and new fishers to pursue Asian carp, which will increase the amount and reliability of fish supply to enable processors to expand their markets. Consensus appeared to converge on a \$.10 per pound incentive with a duration of 7 years, which should be sufficient to stimulate fishing, promote carp product development, and price the fish at a point where the market could sustain itself.

Also important to the industry is the quality and freshness of fish delivered to processors. A clear need was identified to more quickly chill Asian carp, immediately upon catch or at waterside, to preserve freshness and make delivery over larger distances possible. **Providing ice to fishers** via a waterside ice machine is a crucial recommendation to address this quality need.

To better **connect fishers and processors** and facilitate the sale and delivery of fish, a key recommendation is the creation of a co-operative (co-op) to serve as buyer, seller, and distributor of Asian carp. It could be operated as a free exchange service, through membership, or through membership and a fee structure. It would offer transportation of fish, either through a small fleet of co-op controlled (owned or leased) refrigerated

trucks or through contracted trucking. A co-op can improve efficiency of sales, which can lead to increased participation of both fishers and producers, encourage fishing, and increase supply of carp. Connecting the parties also can enable multiple fishers to combine their catches—leading to larger sales, attracting previously inaccessible buyers, and increasing demand for the fish. Once established with a business track record, the co-op could be sold to a private entity with an obligation to maintain carp sales.

Develop brand and marketing strategy. A strong, positive brand that countermands negative perceptions of Asian carp, supports existing carp-related businesses, and resonates with targeted audiences could greatly affect a large number of fishers and processors. Asian carp have significant branding potential as a locally-caught, fresh, sustainable fish option. The fish meat is tender and mild, healthful with beneficial fatty acids, and compares well with other popular fish in terms of purity and low levels of contaminants. Rebranding the fish in a way that distances Asian carp from commonly held consumer misconceptions will be a critical first step in any branding effort. A marketing strategy should be developed to utilize the new brand to support existing businesses.

Because fishing is a low-margin business, particularly for carp, transportation costs are difficult for fishers to absorb. Combined with diversion from fishing that transportation causes, a clear need is present to ***improve transportation infrastructure*** to support Asian carp fishers and processors. Establishment and availability of contract refrigerated trucking, either for full fee or subsidized, could reduce cost burdens on both fishers and processors. Alternately, a small fleet of trucks could be purchased for this purpose and staffed with drivers and a coordinator to manage pickups and deliveries. Either of these options could be managed independently by a sponsoring governmental agency or by the co-op proposed above. Coupled with the incentive, transportation costs can be made affordable for fishers and processors. Moreover, improved fish quality would result from establishing ***standards*** for transportation, logistics for temperature maintenance, and other related measures of freshness. A set of standards should be established and monitored.

Input gathered through this study revealed a number of regulatory challenges, such as restrictions on transport of live injurious wildlife, limits on equipment, and lack of accessibility of new areas for fishing. ***Creating dialogue about regulatory considerations*** to address these matters is warranted. Governmental stakeholders clearly expressed willingness to clear regulatory hurdles through cross-agency coordination and regulatory interpretation. Recommendation is to establish a working group or employ a committee of Mississippi Interstate Cooperative Resource Association (MICRA) to identify and clear regulatory hurdles.

A need also was expressed through this study for ***current, reliable information on fish populations***. A centralized database devoted to capture of Asian carp and accessible to relevant stakeholders would greatly encourage development of more active Asian carp fishing. Integrating all data into a single database would eliminate restraints imposed by limited geographic extents of specific agency databases, allowing for big-picture analysis of population structures, and strategic development of the Asian carp fishing industry. The database could be made available to relevant stakeholders in a variety of formats, including interactive web-based mapping applications, automated reports, and other customized formats.

Engage subject matter experts in Chinese and other international markets. To address a variety of challenges with exporting carp to Chinese and other international markets, the need exists to include an entity

experienced in exporting fish as well as a subject matter expert (large fish processor) with experience in China. A number of subject matter experts (SME) are willing and able to support efforts for further studies and understanding of potential challenges and opportunities regarding export to overseas markets. A systematic approach should be expanded upon to engage these experts and connect potential investors, existing businesses and startups, and Chinese businesses.

The recommendations are summarized in the chart on the following page along with the associated concerns they address.

Recommendation	Key Gaps and Barriers Addressed
Create an incentive program	<ul style="list-style-type: none"> ❖ Too few fishers ❖ Price of fish is too low ❖ Insufficient fish supply
Provide ice to fishers	<ul style="list-style-type: none"> ❖ Fish quality and freshness ❖ Need for improved access to refrigeration ❖ Cost
Connect fishers and processors	<ul style="list-style-type: none"> ❖ Insufficient fish supply ❖ Continuity of fish supply
Develop brand and marketing strategy	<ul style="list-style-type: none"> ❖ Negative image ❖ Non-cohesive branding
Improve transportation infrastructure and standards	<ul style="list-style-type: none"> ❖ Cost of transport ❖ Need for improved access to refrigeration ❖ Continuity of supply
Create dialogue about regulatory considerations	<ul style="list-style-type: none"> ❖ Injurious species status ❖ Equipment restrictions
Provide current, reliable information on fish populations	<ul style="list-style-type: none"> ❖ Communication barriers ❖ Lack of knowledge on fish locations
Engage subject matter experts in Chinese and other international markets	<ul style="list-style-type: none"> ❖ Regulatory hurdles ❖ Subject matter expertise is needed

Action Plan - Implementation and Cost Estimates

An implementation plan was created for each of the recommendations made based on the nature and complexity of the recommendation. A majority of these plans will begin with establishing a procurement process to secure items, such as an ice machine; a contractor to build a structure to house the ice machine; an operator to run a co-op to connect fishers and processors; a marketing firm to create a brand and marketing strategy; and a trucking company to provide refrigerated delivery services. Each implementation plan includes a set of customized steps that coincide with a recommendation's specific characteristics. These steps vary in timeframe, with 2 to 3 months needed for convening a governmental group to address regulatory challenges, and creating a working group to advance Chinese and other international markets coordination and communication. Significant implementation items, such as setting up a co-op and providing an incentive are anticipated to take approximately 10 months to establish.

The cost estimate for the total Year 1 implementation is approximately \$3,225,350, which includes set-up and operation of the incentive, ice machine and building to house the machine, transportation, branding and marketing, and the fish study. Annual operating cost for subsequent years is estimated at approximately \$5,240,150, the increase chiefly due to full adoption of the recommended 10 cent per pound incentive and the removal of 30 million pounds of fish per year. Regulatory, and Chinese and other international coordination components can be managed with existing internal resources. Success metrics also are proposed for each of action item to monitor progress toward achievement of goals. The chart below provides a summary of the costs per action item.

IMPLEMENTATION COST ESTIMATE		
Action	Year 1 Cost incl. Start-Up	Annual Cost *
1. Create an Incentive Program*	\$1,365,150	\$3,426,550
2. Provide Ice to Fishers - 1 Permanent Unit	\$205,400	\$37,700
3. Connect Fishers & Processors (Co-Op - warehouse with cold storage and transportation)	\$1,397,700	\$1,649,600
4. Develop Brand & Marketing Strategy	\$157,300	\$110,000
5. Improve Transportation Infrastructure & Standards**	\$608,000	\$1,182,500
6. Current, Reliable Information on Fish Populations	\$82,500	\$15,200
Total	\$3,225,350	\$5,240,150

Notes:

* Annual Cost for incentive assumes full implementation amount in Year 3.

** Trucking and related contingency counted only once in Total.

METHODOLOGY

The following section provides information detailing the methodology employed and chronicling the work performed to develop the recommendations and action plan contained in this Final Report and Action Plan.

Steering Committee

The first step taken for this study was to create a Steering Committee of key stakeholders concerned with the development of an action plan to remove barriers from businesses that process and sell carp products, and to encourage greater fishing of the species. Members of the committee were selected based on their knowledge 1) expertise, and interest in controlling Asian carp; 2) their representation in a broad range of organizations concerned with the invasive species; 3) support of small business; and 4) ability to influence decision-making within their respective organizations. The purpose of the committee was to guide the study and its recommendations, and to provide support for its implementation. Members of the Steering Committee are listed, with their affiliations, in the chart below.

ASIAN CARP BUSINESS PROCESS ANALYSIS STEERING COMMITTEE MEMBERS		
Kevin Irons	Aquaculture and Aquatic Nuisance Species Program Manager	Illinois Department of Natural Resources
Bill Bolen	Senior Advisor	U.S. Environmental Protection Agency, Great Lakes National Program Office
Ron Brooks	Fisheries Director	Kentucky Department of Fish and Wildlife Resources
Jim Garvey	Professor, Zoology	Southern Illinois University
John Goss	Asian Carp Project Coordinator	Indiana Wildlife Federation
Joseph McKeown	North East Region Senior Account Manager	Illinois Department of Commerce and Economic Opportunity (IDCEO)
Kim Uhlig	Director of Business Attraction	Greater Peoria Economic Development Council
Mike Weimer	Senior Fishery Biologist	U.S. Fish and Wildlife Service

Asian Carp Regional Coordinating Committee (ACRCC)

The consulting team and Steering Committee worked cooperatively with ACRCC, which is currently the lead multi-state coalition managing Asian carp control in the Illinois Waterway. Tetra Tech staff made two presentations to ACRCC: 1) at the outset of the study, and 2) following a presentation of study findings to the Steering Committee. ACRCC's feedback and support, along with its recognition of the benefit of employing private-sector market forces, has been beneficial to the study and will be essential to the advancement of recommendations made in this report.

Research

The work plan for the analysis and action plan started with the review of existing studies, data, articles, and resources. In addition, information was gathered through a series of interviews from a robust list of stakeholders. Research and stakeholder input was used to identify the gaps and barriers preventing businesses from wide-scale fishing of Asian carp.

Articles and Reports

Approximately 40 reports and articles were reviewed and summarized to provide context and background information and to help identify potential issues and solutions. Pieces selected for review were independently identified by Tetra Tech or were suggested by the Steering Committee members or interviewees. The pieces reviewed covered a wide array of content published on various platforms. The majority of the pieces were short, local-media pieces published on online news sites that generally focused on gastronomy and Asian carp-related business ventures. A number of academic studies and peer-reviewed journal articles were also reviewed, including a few with contributing authors from Illinois research institutions or resource management agencies. These pieces generally focused on harvest and fishery management-related questions. Several risk reduction and control strategy reports developed by locally relevant agencies, such as the ACRCC, were also reviewed. Finally, other resources, such as media releases, requests for funding, and program fact sheets were reviewed when determined to be germane. Tetra Tech reviewed each piece and compiled an annotated bibliography, which can be found in Appendix A. The relative frequency of words occurring in the titles of the reports and articles reviewed are shown in Figure 1. The bibliography was shared with the Steering Committee and was used to support the development of recommendations.

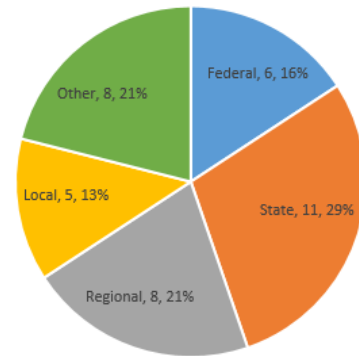


commentary on applicability of resources are more detailed descriptions of each. A representation of these resources with descriptions can be found in Appendix D.

Resources Summary

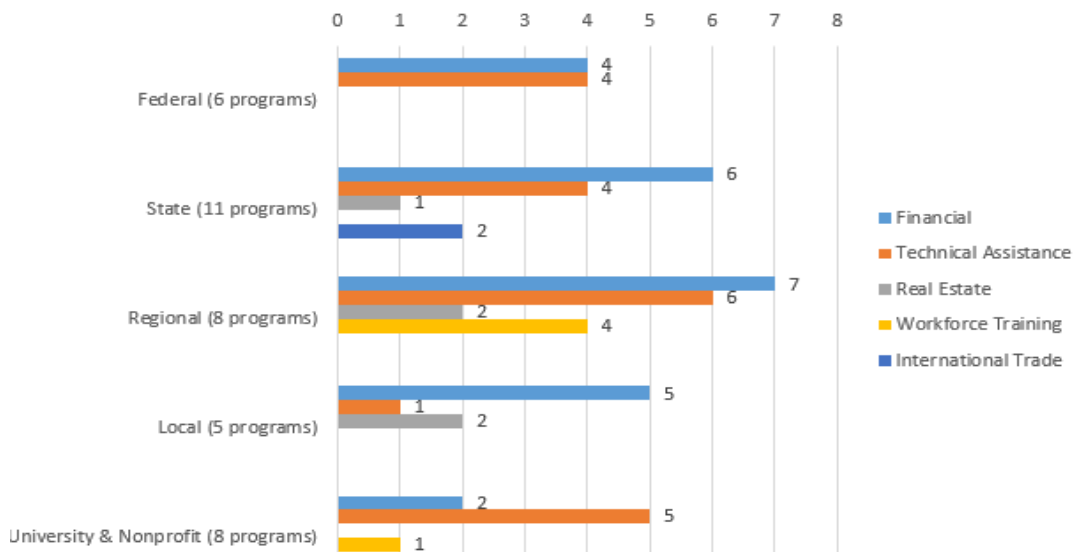
Approximately 40 organizations were identified as being potential resources for small businesses in Illinois to support start-up and expanding business growth. These organizations range from federal agencies to local non-profit groups and other local businesses. Assistance by level of government is depicted in the pie chart to the right by number and percentage of overall number of programs. Universities and non-profits are included in the "Other" category.

Resources by Level of Government



The majority of resources provide financial and technical assistance to small businesses; however, several organizations provide assistance in international trade, real estate, and workforce training. Below is a histogram reflecting types of assistance offered by each level of government. Refer to Appendix D for further information on resources. The use of one or a combination of several of these resources will provide entrepreneurs and small business owners an advantage in creating a successful business.

Resources by Level of Government and Type of Assistance




Applicability

A multitude of financing options are available to help alleviate the costs of starting or maintaining a business. These funding options, along with technical assistance, can help to guide these businesses and, in many cases, revitalize distressed areas. However, utilizing capital resources may be out of reach for certain small businesses. Start-ups, enterprises with thin margins and cash-based concerns, can find it difficult to access

loan programs. Businesses such as these may lack the resources needed to prove their ability to repay loans or to prove they have sufficient cash flow if they do not report all income on state or federal tax forms. In order to access these resources, the fishing industry in the region will need to grow and expand as a whole to generate more revenue and improve business health. Alternately, reward-based assistance (for example, providing an incentive for catching fish or providing resources such as ice to help fishers maintain freshness of their catch) may be more suitable for marginal businesses.

Resources Detail

The following sections provide further detail on federal, state, regional, local, university, and non-profit resources for small business. Those denoted with  are oriented toward or adapted to fishing and fish processing.

Federal

At the federal level, six government agencies and programs are available to assist small businesses in Illinois.

 Of potential relevance for Asian carp fishers is the *U.S. Department of Agriculture's (USDA) North Central Regional Aquaculture Center*, which offers technical assistance to enhance viable and profitable aquaculture for the following:

- Research
- Development
- Demonstration
- Extension Education



The *USDA Rural Development Program* offers businesses with academic research-based findings to help proliferate the fishing industry in the region. Through this program, USDA also partners with public/private community groups and financial organizations to provide financial and technical assistance to stimulate rural business growth. The programs include, but are not limited to, funds for working capital, equipment purchasing, job training, and construction.

Additional programs provide general business assistance, which is potentially applicable to both fishers and producers. The *U.S. Small Business Administration (SBA)* provides financial and technical assistance through four main pathways: business financing through micro-lending and substantial debt and equity investment capital; entrepreneurial development through free face-to-face and internet counseling; federal procurement opportunities, outreach programs, and training; and SBA functions as an advocate for small businesses and testifies to their importance. Partnered with SBA, the *Service Corps of Retired Executives (SCORE)* provides education and counseling opportunities to small business owners through its business mentors, as well as free business tools, business templates, and workshops and webinars.

The *US Economic Development Administration (EDA)* provides multiple financial programs for economic development and planning for distressed communities around the country. These programs support

construction, non-construction, and revolving loan fund investments with the goal of helping to revitalize and redevelop local economies and industries. Additional economic adjustment programs provide small business owners and entrepreneurs with necessary gap financing to start or expand their businesses.

The *New Market Tax Credit Program* provides tax credits to Community Development Entities, which in turn make working capital, construction, and property/building acquisition loans in economically distressed and low-income areas.

State

The State of Illinois offers several programs that are particularly relevant to fishers and processors.



Illinois Department of Commerce and Economic Opportunity (DCEO)

Office of Trade and Investment promotes Illinois businesses worldwide by marketing to attract foreign direct investment interests, providing export assistance, and connecting business owners to global opportunities. Through 10 well-established overseas offices, DCEO leads trade missions, organizes curated overseas tradeshows, and conducts outreach events and seminars.

Entering international markets will prove to be important for local businesses, as there is a large market for carp outside of the United States, especially within various countries throughout Asia. Similar to this office, the Illinois Small Business Development Center and one of its sub-departments, the International Trade Center, assist in international trade and will evaluate a company's readiness to export, provide access to foreign market information, provide documentation assistance, and provide links with trade representatives.



Illinois Finance Authority offers taxable and tax-exempt bonds, loans, and

investment capital for businesses, non-profit corporations, agriculture, and local government. Through its Rural Development Loan Program, it specifically assists businesses with purchase of land, construction or renovation of industrial or commercial buildings, construction or improvement of infrastructure, or purchase of machinery and equipment.



IFA's assistance in the purchase of machinery and equipment is important because it can provide small businesses with the opportunity to expand their production.



Illinois State Treasurer's Office, Agriculture Investment Program provides qualified farmers and agriculture professionals below market-rate loans to cover costs for:



- Farm equipment purchase
- Land acquisition
- Construction expenses
- Conventional, sustainable, or value-added agriculture production

Similar to IFA's Rural Development Loan Program, the ability to cover costs related to conventional, sustainable, or value-added agriculture production is especially useful to processors.

Advantage Illinois (AI) works with the state's banking community and venture capitalists to aid entrepreneurs and small businesses through two main programs, the Participation Loan Program and Capital Access Program. The *Participation Loan Program* provides three options, Standard Participation Loan Program, Minority/Women/Disabled/Veteran-Owned Businesses Program, and a Revolving Line of Credit Program. Funds for these can be used for start-up costs, working capital, business procurement, equipment, purchase, construction, renovation, or tenant improvements of an eligible place of business that is not for passive real estate investment purposes. The *Capital Access Program* allows banks to provide loans to businesses that cannot obtain funding under conventional lending policies and are financed using small amounts of public resources.

In addition to the above programs, the State of Illinois provides four technical assistance resources, which are presented along with each program's goals in the table below.

Technical Assistance Resource	Goal
Small Business Development Center	Provides one-on-one business advice and management assistance, helps with business plan development, accessing market information and marketing plan development; assists with accessing business financing programs, financial analysis, and planning; provides access to business education and training opportunities; and offers specialized services in technology, innovation and entrepreneurial development
Small Business Environmental Assistance Program	Educates small businesses on environmental obligations required to conduct business
First Stop Business Information Center	Provides individuals and businesses with comprehensive regulatory and permitting information
Procurement Technical Assistance Center	Provides small businesses with information regarding selling goods and services to local, state, and federal government

Regional

Financial Assistance

In Illinois, both *Madison County* and *Cass County* provide financial assistance to small businesses within their jurisdictions. Madison County provides funding in conjunction with Justine Petersen, a 501(c) 3 company and top micro-lender for SBA, while Cass County partners with multiple private and public organizations, from universities to banks, to obtain funding by contributions by public entities and private-sector donations.

Financial Assistance, Technical Assistance, Workforce Training

The *Greater Peoria – Economic Development Council (GPEDC)* and the *Two Rivers Regional Council of Public Officials (TRRC)* provide financial and technical assistance and workforce training to small businesses. GPEDC is a 501(c) 6 non-profit organization, supported by investments from businesses, organizations, counties, and cities through Logan, Mason, Peoria, Tazewell, and Woodford counties, that helps facilitate interactions between businesses and communities to help spur economic growth. TRRC is governed by an intergovernmental agreement between Adams, Brown, Pike, and Schuyler Counties, and along with its associated 501(c) 3, the *Two Rivers Council Foundation*, TRRC provides leadership and planning units to spur economic development. TRRC also provides three grants to businesses: Economic Development Administration Revolving Loan Fund (RLF), Community Service, Community Service Block Grant, and USDA-RD grants.

Financial Assistance and Technical Assistance

The *Southern Five Regional Planning District (SFRPD)* and the *Greater Egypt Regional Planning and Development Commission (GERPDC)* provide financial and technical assistance to communities and businesses in their jurisdictions. SFRPD services Alexander, Johnson, Massac, Pulaski, and Union Counties with revolving loan funds, intermediary relending programs, and the Rural Micro Entrepreneurs Assistance Program. GERPDC services Jackson, Jefferson, Perry, Williamson, and Franklin Counties with economic development planning and technical assistance, it also helps to administer local, state, and federal funding programs; assists communities with helping small businesses and startups, and helps communities with retaining and expanding existing businesses.

Technical Assistance, Workforce Training, and Real Estate Assistance

The *Illinois Valley Area Chamber of Commerce and Economic Development (IVA)* and the *Great River Economic Development Foundation (GREDFC)* provide their jurisdictions with technical assistance, workforce training, and real estate assistance. IVA provides assistance to thousands of businesses within LaSalle, Bureau, and Putnam Counties that are looking to relocate to the region or expand within it. Tax incentives are provided to both small businesses and large corporations within enterprise zones and tax increment financing (TIF) zones. GREDFC service the City of Quincy and Adams County. Multiple state funding resources are made available to small businesses, and a variety of workforce training options are available. Both organizations list available commercial/industrial lots and buildings in the region for sale.

Local

As summarized in the table below, five local governments along the Illinois River were identified as resources to provide financial assistance, technical support, and real estate assistance to existing and prospective small businesses. The goal of many of these programs is to revitalize economically distressed areas and to rebuild economic opportunities. Additionally, the cities of Peoria and East Peoria provide lists of available commercial/industrial sites that are available for purchase.

Local Government Financial Resources			
Municipality	River	Financial Resource	Use
Beardstown	Illinois River	Revolving loan fund; enterprise zone tax incentives	Various business-related costs
East Peoria	Illinois River	Revolving loan fund	Gap financing, real estate acquisition, machinery purchasing
Havana	Illinois River	Revolving loan fund; tax increment financing	Various business-related costs
Peoria	Illinois River	Revolving loan fund; tax increment financing	Real estate costs, working capital loans; tax increment financing for public infrastructure, land acquisition, and certain private development costs

Universities and Non-Profit Organizations

Government and regional entities are not the only resources available for small businesses. Universities and non-profit organizations also provide assistance to small businesses in Illinois, a few of which are described below.



The *Illinois-Indiana Sea Grant – Asian Carp* is a collaboration between the University of Illinois and Purdue University. As part of the National Oceanic and Atmospheric Administration (NOAA) National Sea Grant Program, the group provides expertise on aquaculture and aquatic invasive species, as well as climate change, nutrients, Great Lakes ecosystems, and water resources; Sea Grant places a focus on Asian carp. *Purdue University's Department of Agriculture Economics* provides business startup assistance, which includes aquaculture businesses. *Southern Illinois University Center for Fisheries, Aquaculture, and Aquatic Sciences* conducts research and provides knowledge in the fields of fish ecology, fisheries management and stock assessment, ecosystem modeling, and fish health/nutrition.



RiverBend Growth Association was identified as a non-profit organization that works with local communities, businesses, colleges, institutes, and state/county training programs to provide financial and technical assistance, as well as workforce training to residents and businesses within the cities of Alton, Bethalto, East Alton, Elsah, Godfrey, Grafton, Hartford, Roxana, South Roxana, and Wood River; and also in

Foster and Wood River Townships. Of its various financing options, tax increment financing (TIF) can be used for land acquisition, site clearance, building rehabilitation, and public infrastructure construction. Additionally, Community Development Block Grants from Madison County can be used to purchase land, buildings, equipment, and the construction/renovation of facilities.

Recommendation Development

The final step of the methodology involved synthesizing information obtained from the interviews, articles, reports, and resources available to support businesses, to identify gaps and barriers preventing businesses from wide-scale fishing of Asian carp and suggest solutions to remedy acknowledged challenges. These were presented to the Steering Committee in September 2017 and together Tetra Tech and the Steering Committee developed recommended actions.

Using these recommended actions, Tetra Tech created a draft report and provided an action plan and implementation steps along with cost estimates, timelines for implementation, and metrics to measure success. These were again presented to the Steering Committee in November 2017. Feedback and comments are incorporated into this Final Report and Action Plan. Substantive discussion of recommendations, implementation steps, cost estimates, timelines and metrics is provided in the Conclusions and Recommendations section.

FINDINGS

What's at Stake

The negative consequences that invasive species, such as Asian carp, have on the economy are remarkable, costing the United States billions of dollars in damage every year. Infestations of invasive plants and animals negatively affect property values; agricultural productivity; public utility operations; commercial, sport, and subsistence fisheries; tourism; outdoor recreation; and the overall health of ecosystems. Specifically, Asian carp currently threaten native aquatic ecosystems throughout the United States, including the Great Lakes, and Mississippi River basins, and major tributaries such as the Ohio and Illinois rivers. In 2010, the federal government committed \$78.5 million in investments to prevent the introduction of Asian carp to the Great Lakes, with the goal of protecting the basin's unique ecosystem and its fishery valued at over \$7 billion annually. Current expenditures range between \$45 and \$55 million annually. Additionally, large infrastructure projects focusing on new lock and dam designs to prevent the movement of Asian carp and other aquatic invasive species are being designed and currently under review, further underscoring the scope of efforts focused on preventing the expansion of Asian carp.

Recreational Fishing

Nationally U.S. FWS 2011 National Survey of Fishing, Hunting and Wildlife-Associated Recreation identifies fishing as one of the most popular outdoor recreational activities in the United States. As many as 33 million people aged 16 or older participate in the activity, and spend \$48 billion annually on equipment, licenses, trips, and other fishing-related items or events. These funds help create and support more than 828,000 jobs in the United States at a time when many industries are still coping with a challenging economic climate. In some rural areas, the dollars brought in through recreational fishing help support entire communities ("Sportfishing in America," American Sportfishing Association, January 2013).

The economic contributions of recreational fishing have grown steadily over the last several decades. In 2016, there were 35.8 million licensed anglers, with freshwater fishing being the most popular (29.5 million anglers). Additionally, the Great Lakes attracted 1.8 million anglers. Recreational fishing generated over \$46 billion in retail sales in 2016 and contributed \$115 billion to the national economy ("2016 National Survey of Fishing, Hunting and Wildlife-Associated Recreation, National Overview," U.S. FWS, August 2017).

Midwest Recreational fishing in the Midwest is a \$10 billion industry, employing over 143,000 people and bringing in over \$1 billion in state and local tax revenue. Michigan, Wisconsin, Minnesota, and Missouri rank as some of the top fishing destinations in the United States.

Illinois In 2011, recreational fishing in Illinois amounted to over \$804 million in retail sales and employed 10,821 people. Over \$58 million of the retail sales were attributed to fishing in the Great Lakes. Additionally, recreational fishing in Illinois had over \$109 million in federal tax revenues and over \$95 million in state and local tax revenues. According to the 2011 U.S. FWS National Survey (Illinois) there were over 1 million anglers

in Illinois, both residents and non-residents. The state had total expenditures of over \$972 million for recreational fishing.

The following table provides details regarding the economic contributions of recreational fishing in 2011 for the Midwest United States.

State	Number of Anglers (Residents and non-residents)	Total Expenditures (Trip-related, equipment, etc.)	Salaries and Wages	Jobs
Illinois	1,044,000	\$972,729,000	\$430,950,267	10,821
Indiana	801,000	\$671,840,000	\$271,123,276	8,472
Iowa	473,000	\$277,999,000	\$140,627,483	4,312
Kansas	400,000	\$210,303,000	\$99,475,333	3,012
Kentucky	554,000	\$807,293,000	\$319,687,624	10,567
Michigan	1,744,000	\$2,427,110,000	\$1,253,961,302	32,279
Minnesota	1,562,000	\$2,414,257,000	\$1,095,248,651	30,092
Missouri	1,071,000	\$657,024,000	\$253,124,523	7,727
Nebraska	207,000	\$182,679,000	\$83,341,065	2,505
North Dakota	N/A	N/A	\$27,250,227	962
Ohio	1,342,000	\$1,794,642,000	\$771,168,224	25,788
South Dakota	268,000	\$202,797,000	\$107,689,432	3,117
Tennessee	826,000	\$1,137,104,000	\$661,625,802	16,633
TOTAL:	10,292,000	\$11,755,777,000	\$5,515,273,209	156,287

Source: 2011 U.S. FWS National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

Commercial Fishing and Fish Processing

Between 2010 and 2015, commercial fishing in the Great Lakes region resulted in the processing of over 104 million pounds of fish and over \$120 million in sales (National Oceanic and Atmospheric Administration, Office of Science and Technology, Species Locator). In the State of Illinois over the 5-year period of 2012 – 2016, a total of approximately 29,373,700 pounds of Asian carp were fished from the state's waterways, exclusive of state-contracted fishing (IDNR Carp Harvest database). According to the U.S. Department of Labor, Bureau of Labor Statistics May 2016 report, 502 people were employed in the Fishers and Related Fishing Workers labor category in the State of Illinois.

Using Asian carp 5-year average catch statistics from 2012 – 2016 of 5,875,000 pounds per year, and conservatively estimated employment figures among Asian carp fishers of an average of approximately 300 over the same period, it can be estimated that a total of approximately 1,200 jobs can be created if catches are increased from current levels to 30,000,000 pounds per year. Further, Illinois' eight current fish processing facilities employ approximately 440 people and processed a total of 5,774,000 pounds of Asian carp in 2016. With catches increased from current levels to 30,000,000 pounds per year, employment can be estimated to grow by approximately 1,850 jobs, totaling over 3,000 when combined with estimated fishing employment increases. A more thorough economic analysis would need to be conducted to better estimate direct and indirect employment creation and positive economic impact anticipated from increased Asian carp fishing.

The Fish

The physical, nutritional, and behavioral characteristics of the Asian carp present a number of challenges and opportunities. American consumers are cited as having a misguided impression that Asian carp are "trash fish," stemming from confusion between Asian carp and common carp and because of their status as an invasive species. This misnomer implies to consumers that Asian carp have a fishy flavor and a tendency toward contamination. While methylmercury and polychlorinated biphenyls (PCBs) have been detected in the fish, concentrations have been found to be below U.S. Food and Drug Administration (FDA) action levels and many fish contain only low levels of contaminants, such as mercury and lead. ("Fishing Down the Bighead and Silver Carps: Reducing the Risk of Invasion to the Great Lakes." Final Report January 2015. James Garvey, et al; Downs, Jere. 2016. "Invasive Asian carp leaps onto restaurant tables." *USA Today Network: The Louisville, KY Courier-Journal*. September 27.)

Potential issues with consumer palatability have also been noted, as the fish are relatively bony from a traditional American consumer standpoint and they have a tough skin, which has been used to produce leather in some regions. (Lassiter, Lesley. 2016. "Now Appearing On Your Menu...Asian Carp?" *Nashville Scene*. September 22.) Anecdotal evidence suggests the presence of bones is only perceived as problematic for certain segments of the population and the issue of bones in fish is overstated for many consumers. Recently the University of Illinois, Urbana-Champaign campus piloted a program where bone-in grass carp were served to students in the dining halls and staff did not report receiving any complaints. Further, national food service distribution company, Sysco, is reportedly distributing bone-in and other value-added carp products. Speculatively, it may be that some ethnicities within the United States, for example Asian-Americans, are more

accustomed to eating bone-in fish and are less concerned with bones. For consumers that prefer a boneless product, a Kentucky-based startup, FIn Gourmet, has developed a deboning technique specific to the morphology of Asian carp; the company has had initial success with deboned products.

Nutritionally, Asian carp are well placed, with high levels of healthy fats and levels of protein only surpassed by wild-caught salmon. (Lassiter, Lesley. 2016. "Now Appearing On Your Menu...Asian Carp?" *Nashville Scene*. September 22.) Several public tasting events have actually indicated that American consumers are typically impressed by the "pleasant, mild flavor" of the fish. (Lassiter, Lesley. 2016. "Now Appearing On Your Menu...Asian Carp?" *Nashville Scene*. September 22.) Asian carp are eaten all over the world and farm raised in Asia. To counter the common perception of Asian carp as being undesirable in the U.S. market, research suggests that promoting Asian carp as being fish caught in clean, American waterways may be an effective strategy.

Asian Carp Products

Research has shown that there are clearly markets for carp and carp products, including in the commercial food industry, restaurants, dietary supplements, surimi (fish paste), pet foods, fishmeal, and others. Asian carp can be used in a wide array of consumer products from fillets served in school cafeterias to an element in fertilizer. While whole fish sales in grocery stores have not been strong, a number of Asian carp products are selling well and several businesses are poised to expand in both domestic and international markets.

Generally, Asian carp products fall into two categories: products for human consumption and those for non-human consumption. As mentioned previously, bone-in and boneless fillets are on the market as well as prepared products such as fried filets, fish sticks, jerky, hot dogs, sausage, surimi, and heads for fish stock. Asian carp is also being used in health and wellness products because it is an excellent source of Omega 3. Non-human consumption products include fertilizer, leather, fishmeal and pet treats. There is no shortage of product potential for Asian carp and development efforts should continue to focus on high-value and value-added products. A handful of carp product producers have successfully started and are currently in operation. These producers have cultivated their respective markets, taken the risk of starting a business, and have the sales to prove that Asian carp sells.

Fishers

Fishers are a critical component to any business venture involving Asian carp; however, a number of barriers may deter fishers from pursuing carp. Over the past century, there has been a significant decline in the number of commercial fishers in the United States. In 1908, there were more than 2,000 commercial fishers in the State of Illinois with a combined catch of more than 20 million pounds per year. As of 2015, only 40 commercial fishers were registered with the state, with only a small amount regularly seeking commercial catches. Figure 2 below depicts the number of commercial fishers and catches from 1950 to the present.

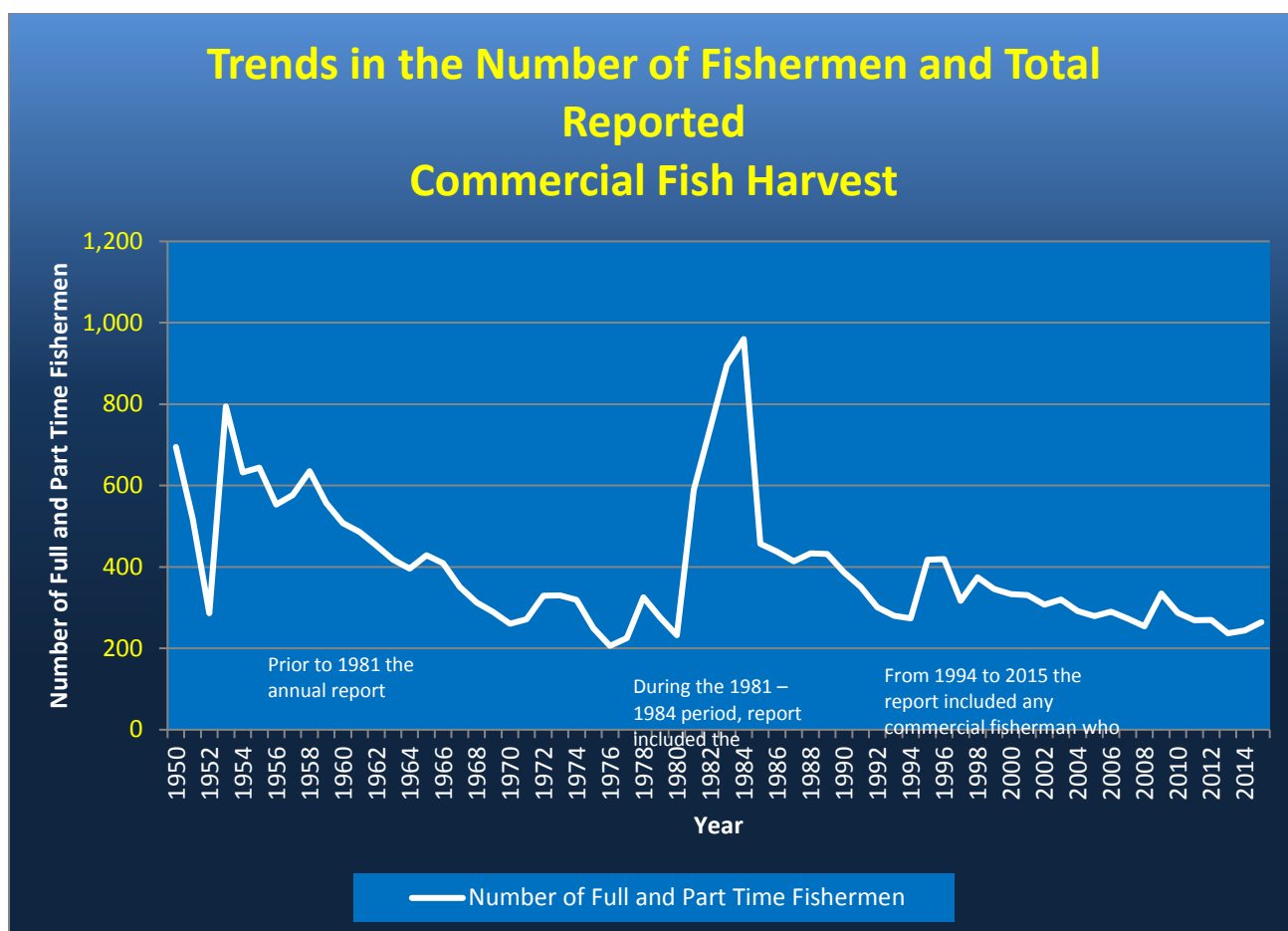


Figure 2. Number of Commercial Fishers from 1950 to 2016.

Source: Illinois Department of Natural Resources

The price of Asian carp is a disincentive for those fishers still active in the industry and it is too low to attract new fishers. Fishers report approximately 10 cents per pound for Asian carp when about 25 cents per pound is needed to pay for labor, nets, ice, gas, and other transportation costs, and make a modest profit. Fishers will not actively pursue Asian carp when other species bring 25 to 50 cents per pound. Fishers also cited difficulty in predicting catch sizes and a lack of information about where carp are located in the river systems. This lack of information may be compounding related problems, such as the type of equipment commonly used by fishers is typically not well suited for keeping fish at quality levels. Processors are needed if long hours are required to amass a sizeable catch or if catches must be transported significant distances.

Currently, it is not perceived as “easy” to enter the commercial fishing industry, nor is it easy work. Training, start-up assistance, an active fisherman’s association, and a public or private partnership to help protect fishers’ interests may ease some of these challenges.

Processors

Processors, like fishers, face formidable challenges in reliably incorporating Asian carp into production streams. Supply, quality, and lack of processing infrastructure are the major inter-related challenges identified. Continuity of fish supply is lacking due to a dearth of connections with fishers and the seasonality of the fish. When Asian carp is in supply, processors have noted some quality and spoilage issues. Quality issues appear to be related, at least in part, to underdeveloped infrastructure systems, such as logistical challenges with cooling needs and transportation. Both supply and quality concerns may be compounded by the lack of processing plants, which constrains harvests to specific areas. Figure 3 on the following page shows existing fish processing facilities as well as the relative abundance of Asian carp in the region. A full list of regional processors and products is provided in Appendix E.

Opportunities to address challenges identified by processors may also lead to synergies in addressing issues identified by fishers, particularly if efforts are undertaken to catalyze and expedite the fisher/processor connection. Establishing relationships between fishers and processors can take time and can be challenged when there is frequent turnover in those seeking participation in the Asian carp market. Some potential solutions include establishing buying stations with a loading dock, large coolers, and ice machines near fishers on the Illinois and Mississippi Rivers; creating a public-private partnership that establishes a warehouse to which fishers can sell and that distributes catches to processors; building infrastructure at fishing grounds; and establishing a series (three to five) of cooperatives to process fish along the Ohio, Mississippi, and Illinois Rivers.

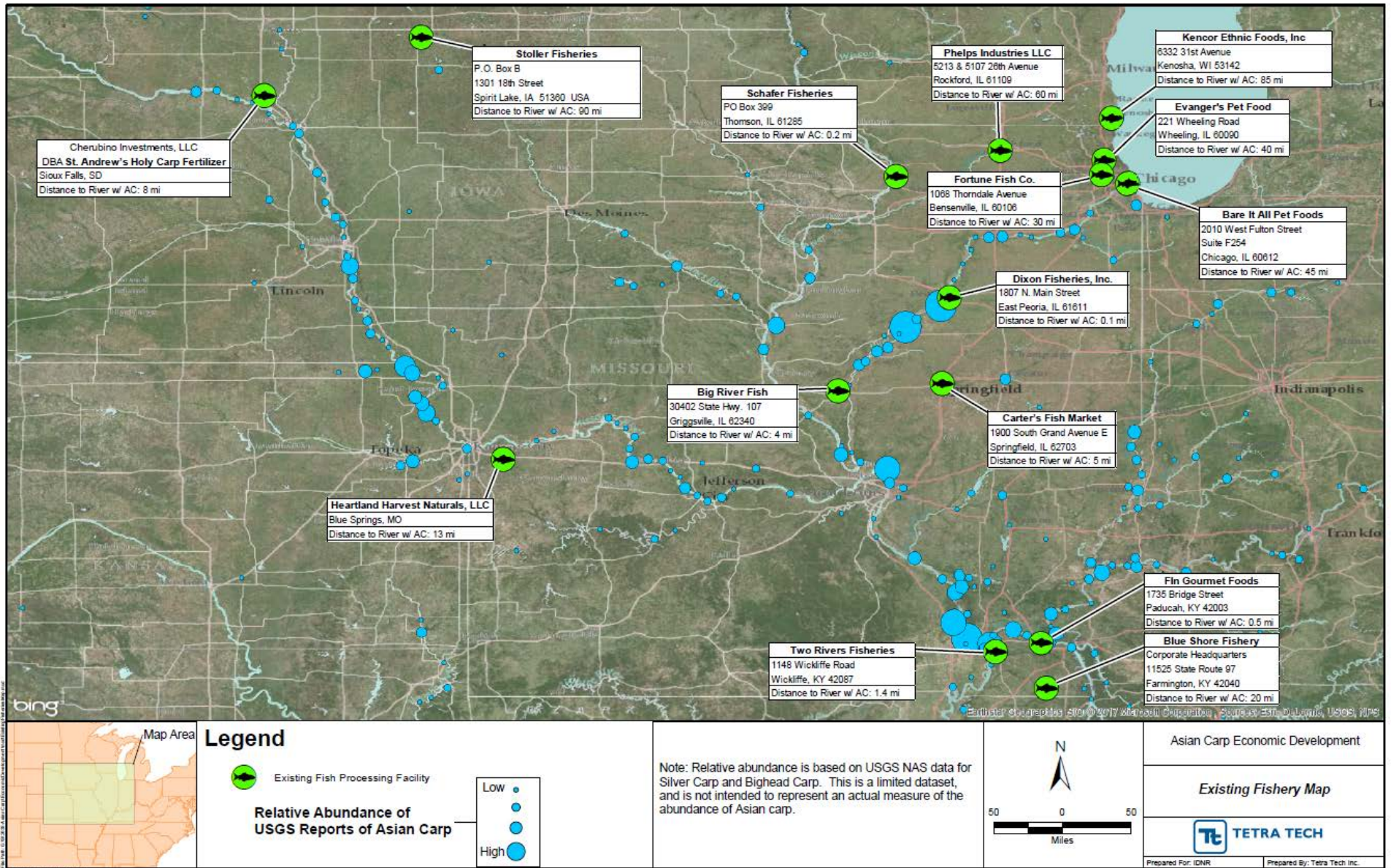


Figure 3: Existing Fish Processing Facilities and Relative Abundance of Asian Carp

Transportation

Transportation solutions are vital to establishing better fisher/processor connections and, therefore, the long-term viability of any Asian carp-related business. Currently, fishers are responsible for fishing and for transporting their catches to processing facilities. The additional time, financial, and logistical challenges associated with catch-and-transport activities are a disincentive and may contribute to decreasing fish quality. The traditional sentiment that fishers should fish and truckers should drive trucks may present opportunities to obtain timely, reliable, cost-effective delivery. After fishers catch the fish, truckers should be immediately available to transport the fish to a processing facility. While appropriate standards are somewhat end-product reliant, freshness and quality are concerns of every processor. Establishing industry standards for both quality and transportation will help ensure the quality and freshness that processors need.

Marketing

The research indicated a wide variety of needs for marketing assistance, as well as a large number of businesses that could benefit from coordinated marketing efforts. As mentioned in the Fish section above, American consumers have negative perceptions about Asian carp, including confusing them with common carp and the reputation as a “trash fish.” Efforts to communicate the positive qualities of Asian carp – pleasant taste, health benefits, reducing invasive species populations – will be fundamental in changing current perceptions. A branding effort for consumer markets may be a potentially game-changing opportunity to recast how the fish is perceived. Marketing surveys have also shown that contaminants were a main consumer concern; therefore, correcting this misperception with American consumers may sway buying choices. In addition, marketing focused on consumer interest in consuming fish caught from clean waterways could be a boon to the industry.

Regulatory

Regulations pertaining to fishers and transportation were noted as challenges. Wildlife species determined to be injurious to the health and welfare of humans, the interests of agriculture, horticulture or forestry, and the welfare and survival of wildlife resources of the United States may not be imported or transported alive between states, the District of Columbia, Puerto Rico, or any U.S. territory without a permit. Asian carp are injurious species; however, this rule only applies to live specimens. While this exception may ease some concerns, challenges still exist as some processors desire live fish for processing. In addition to federal regulations, states may have their own restrictions and rules regarding the transport of invasive species, e.g., evisceration. Coordination of such rules through interpretation to allow ease of transport across state lines may reduce some regulatory hurdles currently impeding supply chains.

In addition to regulations pertaining to the transport of invasive species, fishers suggested that additional environmental regulations may inadvertently create barriers, and larger catches could be obtained by opening up fishing permissibility in areas where it is currently prohibited. There is willingness to have discussions with appropriate resource management agencies about fishing in areas that are currently restricted; however, it was

noted that opening up such areas may require dedication of resources to ensure health and contamination standards are met. Currently, there is an estimated 20 to 50 million pounds of available catch in allowed water bodies, which should be sufficient to satiate current and expanded supply-chain demands.

Fishers also suggested that allowing use of nets and fishing methods currently not allowed under rules and regulations may further increase catches. Regulatory agency representatives indicated their willingness to work with fishers, specifically on types of nets and fishing methods that are conducive to Asian carp populations without significant by-catch. Additionally, it was suggested that a partnership with local universities may be beneficial in that any newly identified techniques could be permitted for research purposes.

Chinese and Other International Markets

Two main avenues to international markets surfaced in the research: the United States Agency for International Development (USAID) program and the Chinese market. Several advantages were identified for obtaining proper certification for Asian carp's use as food aid in the USAID program, including the ability to fish in desired quantities while supporting both domestic and international needs. Barriers to enter this program include meeting the proper and suitable packaging requirements and increased costs of logistics and transportation. Additionally, the fish meal product that would be produced for USAID is quite prevalent worldwide and it can be produced at exceptionally low costs in other countries.

The Chinese market presents several other opportunities and efforts have been made to coordinate and catalyze Chinese investment opportunities in the U.S. market. In early 2017, an Asian carp tour was organized by the USDA Foreign Agricultural Services so that Chinese investors could learn about the clean, healthy, and nutritious carp found in U.S. waters. Additional opportunities include working with Chinese seafood processors to lower or eliminate duty on U.S.-imported carp, and providing tax and other incentives to companies to encourage development of the river fishing supply chain. However, a number of challenges particular to the Chinese market may hamper businesses based on a China export model. The regulatory inspection process for export to China presents a significant burden. Additionally, local political support is critical for successful imports that avoid Chinese-based concerns about competition with Chinese businesses. Some of these issues may be alleviated by pursuing value-added products, rather than attempting to export whole fish.

Regulatory and economic development agencies in the region receive regular inquiries from Chinese-based ventures. However, the majority of these inquiries lack an appropriate level of preparation to be considered viable. Additionally, the volume of fish required for many of these inquiries is beyond the current capabilities of the supply chain and would require significant cultivation. It is also unclear whether volumes being requested could be sustained long term, given the priority focus on prevention, control, and eradication of Asian carp from regional waterways. An entity experienced in exporting fish to China and a subject matter expert (large fish processor) with experience in China need to be identified before any significant exports to China are feasible.

Coordinating carp booths at major international seafood shows in the United States (Boston), Europe (Brussels) and China (Qingdao) is another potential international market entry point. However, it should be noted that all U.S.-

based fish exporters are required to obtain facility certification in the NOAA seafood inspection program, the requirements of which can be viewed as onerous.

Information Sharing

In general, communication barriers exist that inhibit business development opportunities for Asian carp. When information is available, it is often outdated and incorrect. There is a need for current, fact-based, easily accessible information from which fishers and investors can understand the biology of the species and to determine which populations are best suited for significant harvests. From the fisher perspective, there is a lack of information about where best to catch Asian carp.

Opportunities to address these challenges include creating a toolkit (or series of toolkits) that answers questions about using carp as food; providing research on various fishing techniques suitable for Asian carp; and addressing other information gaps. Educational classes or materials, such as a university cooperative-extension-provided course on Asian carp, or information on regulatory requirements for entering overseas markets may be beneficial. Currently, a model is being developed by the U.S. FWS on how fishing can influence the movement of Asian carp up river. Coordinating management information with fishers would allow an opportunity to increase catches and test the influence of fishing on population dynamics and broader management goals.

Business Development

As alluded to in earlier discussion, several business development needs are currently unmet. Many of the issues discussed in previous sections are symptomatic of an uncoordinated approach. The industry needs a solid management team of experts with hands-on experience to oversee the implementation of business development. Ideally, team members with economic development experience would be involved throughout the life of the project. Workforce and site readiness concerns should be a major focus of any effort. The ultimate goal would be to identify a series of compatible and coordinated businesses that have steady need for fish and can pay the fishers on a regular basis. The Steering Committee brings together experts from these disciplines and may assist with business development needs and communication.

Funding

Funding is, of course, critical to any successful business and profitability plays a large role in securing funding streams. The most reliable, long-term option for securing funding is to increase the cost of fish per pound to a level where both the fishers and the end users are able to make a profit.

Funding was repeatedly identified as a challenge during the stakeholder interviews; however, a number of resources for grants and loans were identified (see Appendix D). Frequently, the availability of these resources is based upon the credit of the applicant, which can be a challenge, but particularly for startups that do not have established credit.

Providing a tax break or subsidy incentive, rather than a grant, may be a more tenable, long-term solution. However, both of these solutions also have drawbacks and there have been unsuccessful attempts at voucher-based incentive programs for Asian carp in previous years. Concern was expressed that many small business owners are unwilling to pursue tax credits due to the additional technical complexity of the required paperwork. Incentives may not be desired due to fears about being pushed into a higher tax bracket. This can present an accounting problem as the incentive needs to be counted in the recipient's income. Another potential solution would be to instead add an incentive to processors rather than providing it directly to the fishers. For example, processors could be required to pay a certain amount for Asian carp catches. These payments would be subsidized to some extent. Anecdotally, processors have shown a greater willingness to take on the additional administrative requirements associated with such programs.

Potential Solutions

Through the research conducted, a number of potential solutions were brought forward for consideration based either on individual experience or on pilot projects and initiatives taking place in other target areas.

Transportation logistics and connecting fishers to processors were common areas where potential solutions were offered. One such solution is a floating fish factory. Such an arrangement would allow processing activities to be moved to where fishers are fishing, removing many of the barriers associated with the dispersal of the Asian carp population and the logistical and financial issues associated with transport. This solution also has beneficial long-term implications as the facility can follow the fishers as they follow the fish, thus complementing the long-term goal of managing Asian carp populations. Additional related solutions include creating a private company that buys from fishers and sells to buyers. This is similar to a concept being tested in the State of Kentucky, which involves a warehouse and transportation system developed through a public/private partnership.



Kentucky Public-Private Partnership for Asian Carp

The Kentucky Department of Fish and Wildlife Resources (KDFWR) proposes a Public/Private Partnership (KYAC3-P) to increase the number of dedicated Asian carp fishers in and around Kentucky Lake and Barkley Lake. KDFWR proposes to create a system of communication, coordination, and transportation along with a dedicated KDFWR research unit.

Three commercial fish processors in Kentucky use Asian carp for their products, but are hindered by lack of consistent fish availability due to a shortage of fishers and inadequate coordination and communication. Commercial fishers face increased equipment costs, unreliable markets, and low market rate per pound for Asian carp.

KYAC3-P will work by communicating with fishers harvesting Asian carp, picking up their catches at the boat ramp, and assisting in loading, sorting, weighing, and storing fish when necessary. KYAC3-P also will communicate with and enter into agreements with processors for the sale of fish. KDFWR also will provide funding for equipment, fishers subsidies, and communication services.

As Asian carp numbers decrease in the two reservoirs and demand for carp grows, the pilot project will be expanded to a multi-state effort to increase the availability of Asian carp to processors and decrease current regional dependency of processors on local commercial fishers.

Solutions seeking to increase catches by reducing unnecessary barriers were also common. Not many fishers have traditionally fished for Asian carp and thus do not have knowledge of fishing methods and equipment that are best suited for the species. Methods such as the use of trammel and gill nets, banking boats along shorelines, revving engines, and banging on boat sides have all been suggested. In addition, providing regularly updated and easily accessible information on the temporal and spatial distribution of Asian carp would be helpful to fishers not familiar with the habits of the species. Increasing the number of fishers through a young fisher training program has also been suggested as a method to increase the harvest.

Another solution posited was a focused removal program that would be implemented through predetermined extraction contracts. In such an arrangement, members of the public or a service provider would be paid to remove Asian carp. Another avenue suggested to increase harvest rates was to move away from commercial fishing and to promote recreational harvests. Similarly, a bounty program may be viable, whereby a predetermined cash amount is allocated to an individual for collecting Asian carp. Funding for such programs could be supported, at least in part, through fees associated with fishing licenses.

Certification programs have also been put forward as a potential solution. Such a program would entail the creation of "certified" areas based on number of fish, land, suppliers, workforce, etc. to help investors understand where they can locate a business and to help guide the start-up. The development of a database that could identify potential carp locations, based on a number of different criteria, would be useful in moving toward a certification solution. The database would also address a number of challenges and support new opportunities.

CONCLUSIONS AND RECOMMENDATIONS

The following section provides information detailing recommendations of the Business Process Analysis. Each section discusses conclusions and each recommendation was determined.

Recommended Solutions

Recommended solutions to gaps, challenges, and issues identified through the course of the business process analysis are outlined in the following sections. These solutions are recommended because they have greatest potential to increase fishing of Asian carp as part of the comprehensive management strategy. While no one solution will likely serve as a panacea to meet the challenges associated with Asian carp in the region, implementation of an assortment of recommended strategies will significantly aid efforts to attain management goals. Additional details regarding specific implementation steps, timelines, cost estimates, and measurements of success are available in the Action Plan and Implementation chapter. The summary listing of recommended solutions below is followed by discussion of each.

Recommended solutions are as follows:

- Create an incentive program.
- Provide ice to fishers.
- Connect fishers and processors.
- Develop brand and marketing strategy.
- Improve transportation infrastructure and standards.
- Create dialogue about regulatory considerations.
- Provide current, reliable information on fish populations.
- Engage subject matter experts in Chinese and other international markets.

Create an Incentive Program

Incentive programs can fill several key gaps and meet challenges that were identified during the interview and research portions of this study. Chief among these is the price at which carp can be sold to producers. Based on feedback during interviews and some consensus on the per pound price gap, recommendation is to create an incentive to raise the price at which fishers sell carp by 10 cents per pound. This amount is expected to provide sufficient inducement for existing fishers to increase their catches of the fish, and can be expected to encourage new fishers to enter the market. Increased numbers of fishers and catch quantities will provide greater supply to producers who in turn will be able to expand their sales and markets.

The design of the incentive program must be sensitive to user concerns regarding tax implications and can be structured as direct compensation to fishers, administered through processors, or could be structured as contracted fishing. A “ramp up” period is recommended to ensure that both administrative concerns of end users and incentive to providers are addressed appropriately in the incentive design. In addition, a tracking and evaluation program should be established to ensure that incentives lead to desired effects. Additional program logistics that should be considered are a reliable source of funding, time span over which the incentive will be in effect to sunset, and identification of additional criteria critical to meet management goals.

A time frame of 7 years is recommended for the incentive to sunset, with expectation that within this time frame it will have induced increases in quantities of Asian carp supplied to processors, who in turn will have expanded their markets and stimulated enough demand for carp-based products to have increased the price of Asian carp to a level of sales/marketing sufficiency. This period would include a 2-year ramp-up to stimulate wide adoption of the incentive and entry of new fishers to the market, 3 years of strong support, and a 2-year ramp-down.

Based on findings of this study, recommendation is to administer the incentive through producers, not only to ensure that carp are caught *and* used, but to least disrupt the customary sales process and encourage widest adoption of the incentive. Working through processors also will be efficient, given their few numbers, existing relationships with fishers, and established purchasing and accounting processes. This incentive recognizes and will take into account the recommendations by Pasko and Goldberg (2014).

Key Gaps and Barriers Addressed:

- **Price of fish is too low**
- **Too few fishers**
- **Insufficient fish supply**

Provide Ice to Fishers

Challenges pertaining to fish quality and freshness stem from the large geographic area being fished and dispersal of processing facilities. Ice machines will be a cost-effective means to meet those challenges, and installations of these could occur within a short time frame. Machines can be strategically located—right below dams and close to where boats put in. Moreover, this solution will allow a number of end users (fishers and processors) to benefit from use of shared equipment. Ice could be offered free to encourage use, or at low prices that can significantly reduce or disperse uptake costs. Careful consideration of the following is necessary: deployment logistics such as staffing needs, machine housing, and provisions of water and electricity; and determination how to select locations. Early dialogue with fishers and other ice machine users will help ensure appropriate fit of the selected strategy with local needs.

Two additional methods of ice provision were explored—via truck without cold storage or via mobile ice units. However, these were determined to be infeasible. Delivery of ice without cold storage requires coordination with

fishers that may be untenable given the variable nature of fishing. Mobile ice units could go to locations of fish, but cumbersome need for onboard water supply would hinder implementation of this alternative.

Key Gaps and Barriers Addressed:

- **Fish quality and freshness**
- **Improved access to refrigeration**

Connect Fishers and Processors

Several solutions have been posited to better align and connect fishers and processors. Some of these solutions, such as emulating the public-private partnership model currently being pursued in Kentucky (highlighted on page 21) will require significant initial administrative and financial resources. The key reason to connect fishers and processors is to improve efficiency of sale, which will increase participation of both fishers and producers, encourage fishing, and increase supply of carp. Connecting the parties also can enable multiple fishers to combine their catches—leading to larger sales, increased efficiency, attracting previously inaccessible buyers, and increasing demand for the fish.

There are several options for connecting fishers and processors (and facilitating sales). A limited version would be to develop a website and app to help fishers and producers connect more easily. This would be a less resource-intensive solution, but would leave communication and sales to the users. A more robust option would be establishment of a warehouse facility and cold storage for small- to medium-sized catches. The ability to offer chilled storage decreases the time differential between catch and pickup, and allows combination of catches for larger sales. This model could go one step further and function as a co-operative (co-op), serving as a buyer in itself. It could be operated as a free exchange service, through membership, or through membership and a fee structure. Another addition to this option could be transportation either through a small fleet of co-op controlled (owned or leased) refrigerated trucks or through contracted trucking. Furthermore, the co-op could include personnel serving as inspector(s) who would ensure and record maintenance of temperature, fish handling, and freshness. The co-op model, however adopted, would help facilitate and stimulate sale of Asian carp, and demonstrate the market for its services. Once established with a business track record, and positive net income, the co-op could be sold to a private entity with certain obligation to maintain carp sales.

Greater concentration of resources can be expected to yield stronger co-op membership, though will require greater capital investment. Type and scale of efforts to connect fishers and processors will depend significantly on funding, and will necessitate careful planning to leverage resources to greatest effect.

Key Gaps and Barriers Addressed:

- **Insufficient fish supply**
- **Continuity of fish supply**

Moreover, improved fish quality would result from establishing standards for transportation logistics for temperature maintenance and other related measures of freshness. A set of standards should be established and monitored.

Key Gaps and Barriers Addressed:	<ul style="list-style-type: none"> ➤ Cost of transport ➤ Need for improved access to refrigeration ➤ Continuity of supply
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Create Dialogue about Regulatory Considerations

Investigative research revealed a number of regulatory challenges pertaining to restrictions on transport of injurious wildlife, equipment restrictions, and accessibility of new areas for fishing. Governmental stakeholders have clearly expressed willingness to clear regulatory hurdles through cross-agency coordination and regulatory interpretation. Need for dialogue is evident among state regulatory agencies, law enforcement, fishers, processors, universities, and other relevant stakeholders to (1) better understand the legal and logistical implications of existing regulatory requirements, (2) devise interpretive solutions, and (3) communicate these interpretive solutions to those affected. Recommendation is to establish a working group or perhaps employ a committee of MICRA to identify and clear regulatory hurdles.

Key Gaps and Barriers Addressed:	<ul style="list-style-type: none"> ➤ Injurious species status ➤ Equipment restrictions ➤ Restricted areas
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Provide Current, Reliable Information on Fish Populations

A centralized database devoted to capture of Asian carp and accessible to relevant stakeholders would greatly encourage development of more active Asian carp fishing. Integrating all data into a single database would eliminate restraints imposed by limited geographic extents of specific agency databases, allowing for big-picture analysis of population structures and strategic development of the Asian carp fishing industry. The database could be made available to relevant stakeholders in a variety of formats, including interactive web-based mapping applications, automated reports, and other customized formats. A single comprehensive database on Asian carp captures would allow both governmental/scientific and fishing industry stakeholders to access key datasets, including the following.

Recent Asian carp capture rates:

Governmental/Scientific: This information could guide estimates of current Asian carp population structure and locations, and link to estimates of Asian carp harvest needed to achieve strategic management goals. Large-scale temporal trends in population movements and concentrations could be analyzed.

Fishing Industry: This information could enable identification of where Asian carp populations are most concentrated to maximize removal/harvest efficiency. On a smaller geographic scale, recent capture rates could be referenced to avoid repetitive harvests at the same locations, which typically leads to lower capture rates.

Long-term trends in Asian carp population structure and location, analyzed at range of geospatial scales:

Governmental/Scientific: Asian carp capture data analyzed over long time periods will reveal trends in population movement and structure. This long-term information could be combined with other datasets (climate data, water quality and flow data, etc.) to analyze relationships between numerous external factors and Asian carp populations.

Fishing Industry: Trends over long time periods could be referenced for guidance on big-picture planning for the fishing industry, such as sections of rivers that should be targeted for fishing, and optimal locations for fish processing and distribution centers.

Key Gaps and Barriers Addressed:

- **Lack of knowledge on fish location**
- **Communication barriers**

Engage Subject Matter Experts (SME) in Chinese and Other International Markets

A number of SMEs are willing and able to support efforts at further study and understanding of potential challenges and opportunities regarding export to overseas markets, with special focus on the Chinese market. Development should continue of a systematic approach to engage these experts and connect potential investors, existing businesses and startups, and Chinese businesses. An initial meeting should be convened with goals of strengthening the network of agencies and SMEs involved in international markets, and establishing a framework for managing inquiries. A result of this meeting could be establishment of a work group to periodically share information on international trends or to regularly consult on inquiries. While need is evident for expansion of the scale of carp fishing before it will be attractive to large Chinese processors, establishing a strong network now will be good preparation for that desired eventuality.

Key Gaps and Barriers Addressed:

- **Subject matter expertise is needed**
- **Regulatory hurdles**

ACTION PLAN AND IMPLEMENTATION

Implementation and Timelines

Implementing actions recommended in the previous section requires plans based on the nature and complexity specific to each action item. A discussion for each is provided below, followed by a timeline for the corresponding plan in monthly increments. Shortest implementation plan will take 6 months to hire a trucking company for transport of carp from water's edge to processors, while longest will take nearly 1 year to identify an experienced operator and to set up the co-op. Two ongoing implementations will extend beyond 1 year and can be started immediately, to 1) identify and address regulatory issues, and 2) support Chinese and other international coordination.

Each implementation plan and associated timeline is laid out separately to allow varied starts without disruption of dependencies. However, concurrent implementation of two or more intensive plans, such as the incentive and co-op, should be expected to require additional time. The combination of these two actions is estimated to add approximately two more months to the schedule. Timelines assume timely provision of information from the Steering Committee and other relevant parties, and timely responses to meeting requests and correspondence.

Create an Incentive Program: Careful thought must be given to the structure of the incentive, not only to achieve stated aims and address referenced challenges, but to ensure equitable administration and careful fiduciary management. Specific consideration must also be given to preventing decline of the base sale price of fish, and to other unintended consequences. The initial step should be to create a detailed incentive structure, an implementation outline, and a detailed schedule, which should be presented to the sponsoring agency for feedback and adjustment. Then, essential to success of the incentive, will be a test of it via two separate meetings with processors and fishers. Gaining industry input not only will improve the incentive and help avoid certain difficulties; this also will serve to educate future users and to foster buy-in. These activities are anticipated to take up 3 months.

Over the next approximately 4 months, attention will be turned to development of needed forms, policies, and procedures; accounting and auditing; and legal review. IT personnel also will be needed for on-line and electronic program administration, accounting and bookkeeping, web presence, and app development, if applicable. Upon appropriate approvals of program parameters, administration, and documents, the following three months will involve recruitment of processors to administer the incentive, creation of educational materials for fishers, and training of both staff and processors. After this, the incentive can be launched in the following month during a press event to announce the available incentive, generate interest from fishers, and herald innovation of the sponsoring agency. Finally, as the program launches, close monitoring of it will be necessary to smooth unanticipated issues. Altogether, the time frame for implementation of the incentive will be 10 months.

Provide Ice to Fishers: As discussed in the Cost Estimates section, the most cost-effective means of providing ice to fishers will be to purchase industrial-sized ice-making machines and house them at accessible locations near carp fishing areas. It is recommended initially that one refurbished machine be purchased, with additional machine

purchases following based on success of the first. This machine should be capable of producing at least 5 tons of ice per day and can be expected to operate 9 months out of the year. An appropriate location for the initial machine and its housing must be determined and secured, whether on state property, or by lease, purchase, or grant. Two Requests for Proposals (RFP) must be issued—one for the machine and the second to a construction company that will design and build the structure to house the machine, and to provide water and electricity. During these activities, policies and procedures also will be created to govern hours of operation, distribution of ice to ensure maximum use to chill carp, and security of the machine. Site control and procurement will take up an estimated 5 months, and construction another 4 months, with staff secured and trained to administer the ice, and outreach to fishers to make them aware of the resource. During month 10, it is expected that the ice machine operation will be launched with a press event. Operation of the machine must be closely monitored to quickly address unanticipated challenges.

Connecting Fishers and Processors: Among several options that could be exercised under this subject, establishment of a co-op is proposed because it poses the strongest potential of structures considered for significant increase in Asian carp fishing, with possibility of recouping the investment through sale of the operation to a private entity. Further thought must be given to parameters of the co-op, and development and issuance of an RFP to secure a co-op operator—with careful scrutiny of submitters' proposals and qualifications. As the RFP process advances, a location must be found for the co-op that satisfies space requirements (approximately 20,000 sf), is accessible to fishers and processors, and ideally has several loading bays. These activities are anticipated to take about 5 months. During the 3 months following selection and contracting of the operator, the operator will oversee installation of cold storage and assume responsibility for purchases of equipment such as an ice machine, fork lifts, scales, totes, and office furnishings. The operator also will oversee website development and recruit membership. Finally, during the ninth month, launch of the co-op will occur via a ribbon cutting event to highlight its new services to facilitate Asian carp fishing.

Develop Brand and Marketing Strategy: To initiate a branding exercise and development of a marketing strategy, a RFP process will need to be conducted for a marketing company with experience creating successful brands for agricultural products that support small businesses. The selected firm will need to demonstrate ability to create marketing strategies with limited funding that maximize value. Careful consideration of proposal submittals and interviews will be necessary to find a company appropriate for these activities. Ideally, a small or regional firm with experience may be preferable and more affordable than a full-service firm. Assuming completion of this selection process within approximately 4 months, the following 4 months will be devoted to a branding exercise and development of a marketing strategy.

Improve Transportation Infrastructure and Standards: To fully understand and specify the service required to transport fresh-caught Asian carp from waterside to processor, clearer understanding of trip parameters such as distance, number of trips per day and week, refrigeration, and temperature of storage will be necessary. Achieving this understanding will necessitate significant contact with local fishers and processors within the State and region over a 2-month period. Then an RFP for transport of fresh-caught Asian carp can be developed and issued, proposals evaluated, selection made and contract executed over a 4-month period. Also during this time span, development of standards for transportation and procurement of one or more inspectors could occur.

Create Dialogue about Regulatory Considerations: A working group of related agencies should be established to identify and periodically convene to address regulatory considerations. This group could be either an independent work group or an existing committee of MICRA asked to assume the responsibility. Among issues revealed during interviews to obtain information relevant to this report, the most significant was intra-state coordination of transportation of Asian carp across state lines. The first item to address could be interpretations of regulations regarding intra-state transportation of carp, followed by memorialization of action(s) consistent with those regulations, and dissemination of that information to relevant parties. Completion of this process is expected to occur within a 4-month period, and should be repeated periodically as issues arise.

Provide Current, Reliable Information on Fish Populations: Integration of existing data and future data into a single database will require five primary project tasks, possibly supplemented by a wide range of additional efforts, depending on needs of relevant stakeholders. The first task will be a review of existing Asian carp capture databases, which will require cooperation of all government agencies and universities that currently maintain databases tracking Asian carp capture data. A detailed review of each database would occur to evaluate these data, key data fields, data characteristics, and general database structure. Some similarities among agency databases are expected, although the databases likely are structured and maintained differently by use of a range of different software. This review will provide key information about level of effort required to combine these databases into a single comprehensive database, as well as guide key decisions regarding database structure.

The second task will be construction of a comprehensive database referencing gathered information cited above. Current data collection tools utilized by agencies, such as the FISH app, also will be used to guide database development. During this task, database tables, fields, and data types will be defined, as will key relations among datasets. Selection of a software program for development and maintenance of the database will occur. Writing the database on structured query language (SQL) is expected because of SQL's wide applicability and versatility, and ability to quickly transition static databases to live interactive databases via services such as SQL Server.

The third task will be to populate the comprehensive database with existing datasets. The database will be designed to allow for easy incorporation of existing datasets to the extent practicable, but it is anticipated that some level of data manipulation will be required to allow for integration of datasets from multiple sources currently lacking a uniform structure. Based on likely sizes of existing datasets, custom data import scripts will be developed to automate necessary data manipulation processes, thus reducing time necessary for data manipulation by allowing automated batch processing, and greatly reducing user errors typically associated with manual data manipulation. Scripts developed during this process could also be used for future data uploads, although recommendation is that data-producing stakeholders alter their respective databases to more easily interact with the comprehensive database following development of the comprehensive database. Web-based Graphical User Interface (GIS) applications can be helpful in accomplishing accessibility of information. As well, simplified information can be made available through cell phone apps.

Following population of the comprehensive database with existing datasets, the fourth task will be development of data presentation and analysis tools necessary to render the database useful for stakeholders. Given the geospatial character of data that would populate the database, recommendation is for use of an interactive web mapping application as the primary tool for data presentation and analysis. Custom data analysis tools can be integrated into

web mapping applications to allow for isolation of specific datasets, comparison of multiple datasets, etc. This task will require substantial input from governmental and industry stakeholders to build out tools easily useful by relevant stakeholders. Completion of the first four tasks is expected to occur over a 9-month period.

Like any database system, the comprehensive database will require ongoing, regular maintenance primarily consisting of ongoing data uploads and regular performance and quality control checks—the fifth task. Similarly, maintenance of the web mapping application will be ongoing, with development and integration of new tools as need arises.

Engage Subject Matter Experts in Chinese and Other International Markets: To better coordinate inquiries from foreign countries and support export of Asian carp, a group of interested entities such as the state International Trade Office, Chinese Embassy, USDA, and others should meet to strengthen communication and coordination. These meetings could occur periodically to share information, discuss and vet inquiries, and consider other relevant information. This group could meet quarterly, three times per year, or as needed.

Implementation Timeline

TIMELINE												
IMPLEMENTATION ACTIONS	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Create an Incentive Program										10 Mos.		
Create detailed incentive structure, implementation outline & sched.												
Meet with administering agency for feedback												
Convene processor & fisher groups (2) for input and feedback												
Incorporate feedback and finalize incentive terms												
Develop forms, policies & procedures, accounting/auditing, legal, IT												
Secure needed approvals												
Recruit processors to administer incentive												
Prepare and conduct staff training												
Prepare and conduct processor administration training												
Prepare education materials and conduct fisher education campaign												
Press event and launch												
Feedback and corrections												
Provide Ice to Fishers										10 Mos.		
Site location and site control (lease, purchase, grant)												
Develop 2 RFPs - for ice machine and structure construction												
Develop policies & procedures for operation, distribution, and security												
Release RFPs, Q&A, hold open for 3 weeks												
Review, selection, approval, purchase (machine) / contract (constr)												
Constr. admin. / building construction incl permits, water, electric												
Staff - job descr, posting, resume review, interviews, offer, on-boarding												
Outreach to fishers												
Launch												
Feedback and corrections												
Connect Fishers and Processors²									9 Mos.			
Develop Co-op Operator RFP - business plan and proposal												
Release RFP, Q&A, hold open for 6 weeks												
Review, interviews, selection, approval, and contract												
Site location and site control (lease, purchase)												
Cold storage installation												
Equipment purchase - ice machine, fork lifts, scales, toles, office												
IT - website, app												
Membership												
Press event and launch												
Develop Brand and Marketing Strategy								8 Mos.				
Develop RFP & selection criteria for marketing company												
Release RFP, Q&A, hold open for 4 weeks												
Review and selection												
Approval and contracting												
Engagement - brand creation and basic marketing strategy												
Contract administration												
Brand and marketing strategy implementation												
Improve Transportation Infrastructure and Standards³						6 Mos.						
Define trip parameters												
Develop RFP & selection criteria for trucking company												
Release RFP, Q&A, hold open for 4 weeks												
Review and selection												
Approval and contracting												
Contract administration												
Standards development												
Inspector procurement												
Create Dialogue about Regulatory Considerations	ONGOING											
Identify issues to be addressed												
Identify group to address - work group, ACRC committee, other?												
Convene												
Due diligence												
Memorialize and circulate												
Monitor												
Provide Current, Reliable Information on Fish Populations									9 Mos.			
Identify relevant databases and responsible agencies												
Outreach to agencies and convene initial meeting												
Define data integrity and update responsibilities												
Build database												
Populate database												
Data presentation tools development												
Maintain and improve database												
Engage SMEs in Chinese and Other International Markets	ONGOING											
Identify group related to international and Chinese markets												
Define agenda, invite attendees, convene												
Follow-up												

Notes:

█ - full implementation complete. Chinese and International Coordination, and Regulatory are reflected without a completion dates as these are intended to be an ongoing activities.

The timeframe for each Implementation Action is reflected independently other actions. Combination of tasks will likely affect schedule.

Timelines assume timely provision of information from the client and relevant parties, and response to meeting requests and correspondence.

¹ Assumes construction of one stand-alone structure and installation of a single ice machine.

² Assumes co-op with warehouse and ice storage facility. Transportation costs reflected under Transportation and Standards.

³ Assumes contract trucking, not co-op owned or leased fleet.

Lead and Support Agencies

Consideration of the agency(s) to administer implementation of actions recommended in this report is important—based on source of funding, expertise in subject matter, and other factors. Clearly, a coordinated, integrated approach is essential to success of the program and achievement of significant Asian carp fishing goals specified in this report. Necessary staff and agency resources, and perhaps external expertise, must be devoted to the effort. An appropriate organization to administer chief aspects of this program will be a state-level agency operating in the field of economic development and/or finance, given that the incentive and co-op components are business oriented. Monitoring and evaluation throughout implementation is essential as any plan must be adaptable to changing conditions. The Steering Committee may be able to facilitate needed adaptation to ensure success.

Cost Estimates

The figure on the following page shows a high-level cost estimate for action items requiring external resources. These include the Incentive, Ice Machine, Transportation, Brand and Marketing, and the Fish Study. Action items for which existing internal resources will suffice include Regulatory, and Chinese and Other International Coordination. Below are listed estimates for the year 1 costs, followed by annual costs. Immediately below, *is a chart providing costs to sustain actions over 7 years in the grand total amount of approximately \$31,859,200*. The costs provided below are estimates based on current conditions and noted assumptions. Actual costs may vary depending on implementation sequence and timing, market conditions, and other factors.

COSTS OVER 7 Years	
Create an Incentive Program	\$17,854,200
Provide Ice to Fishers - 1 Permanent Unit	\$1,217,000
Connect Fishers and Processors - Co-op. 3 yrs ^{1, 2}	\$2,911,800
Develop Brand & Marketing Strategy	\$817,300
Improve Transportation Infrastructure and Standards	\$8,885,500
Information on Fish Populations	\$173,400
Grand Total	\$31,859,200

¹ Sale in year 3, subsidized years 4 - 7 at \$225,000 per year.

² Co-op figures do not contain transportation costs.

Year 1 A total of **\$3,225,350 is estimated for year 1 costs**, including start-up, procurement costs, and operation. These are broken out as follows:

- ▶ **\$1,365,150 for setup and initial incentive** of \$.10 per pound on 10 million pounds of carp
- ▶ **\$205,400 for purchase of a refurbished ice machine** capable of producing 5 tons of ice per day and operating 9 months out of the year, and construction of a structure to house it
- ▶ **\$1,397,700 for procurement of a co-op operator, for a 20,000-sf warehouse, and installation of cold storage**, with contracted **trucking services of \$608,000** for delivery of 10 million pounds of Asian carp over approximately 530 trips, at \$975-\$1,150 per trip
- ▶ **\$157,300** for procurement and completion of **brand development, regional marketing strategy, and marketing**
- ▶ **\$82,500 for the fish study** to create a comprehensive database of all currently available information regarding Asian carp.

Annual Operational costs at full implementation total \$5,240,150. As fish study will be complete, remaining items are broken out as follows:

- **\$3,426,550 for full operation of incentive** on 30 million pounds of carp
- **\$37,700 for ice machine, staffing and maintenance**
- **\$1,649,600 for operation of the co-op**, with contracted **trucking services of \$1,182,500** for delivery of 20 million pounds of Asian carp
- **\$110,000 for marketing**
- **\$15,200 for fish database maintenance, upkeep, report generation.**

Discussion of each item is provided below. Assumptions and further detail are shown on the Cost Estimate figure on the following page. The total cost figure for each action item includes 10% contingency to cover likely unanticipated costs associated with this innovative project.

Incentive: The estimated costs associated with the incentive fall into two chief areas, that of the incentive and the considerable undertaking to establish it. The \$.10 per pound incentive is assumed in the first year to result in fishing of 10 million pounds of Asian carp, or disbursement of \$1 million of incentive funds. A management fee of \$100,000 per year is recommended to be provided to the entity managing the program to defray administrative costs. An annual audit, estimated at \$7,000 per year, is recommended to be performed to ensure proper financial

accounting and management of the program. Setup of the incentive is estimated to cost \$126,000 and includes detailed structuring; and creation of operating policies, procedures, forms, fee structure, IT interface, disbursement processes, accounting and record keeping interface, staff training, etc. An additional \$8,000 is assumed for annual support, which includes program adjustments, updating, reporting, and similar administrative duties.

The incentive program is expected to ramp up over the first two years, from 10 million pounds to 20 million; then is expected to peak in Years 3 through 5, as incentive adoption grows, stimulates supply, producers expand their markets and increase demand for their products. The program will then ramp down in Year 6 (at \$.07 per pound) and Year 7 (at \$.04 per pound) and will end in Year 8, as the market can be expected to sustain itself at this time.

Incentive costs are estimated as follows:

- Year 1 \$1,365,150
- Year 2 \$2,326,500
- Years 3 through 5 \$3,426,500 each year
- Year 6 \$2,436,500
- Year 7 \$1,446,500

Together these costs will total approximately \$17,854,200 over the recommended 7 years of the incentive.

Provide Ice to Fishers: Costs associated with securing an ice machine, building a structure to house it, and staff to dispense ice are estimated at \$205,400. The ice machine is estimated at \$60,000, with annual maintenance costs of \$2,600 based on information gathered from fish processors. The unit should be refurbished to maximize value (new machines cost \$100,000 or more) and have the capacity to produce at least 5 tons of ice per day. Monthly costs for a location for the machine are estimated at \$500 per month; however, free space on state-run land will be pursued first. Construction of a structure to house and secure the unit is estimated at \$60,000 for design and permits, construction of the slab and structure, electrical and water connection, and paving. One-time builder's insurance is estimated at \$2,000 and annual property and equipment insurance, if necessary, is estimated to be \$1,000. Staff required to oversee ice dispensing is estimated at one person for 20 hours per week, \$20 per hour plus benefits of 40% of hourly rate, for nine months of the year totals \$21,672.

Locating and securing a site for the machine is estimated at \$3,000, which is based on less than a week's work for all related activities. Procurement processes will be necessary to obtain the ice machine and are estimated at \$10,000. Procurement costs for the construction company are estimated at \$12,000 plus \$800 per month for three months of construction administration for a total of \$14,400. Finally, costs associated with outreach to fishers are estimated at \$3,000, amounting to less than a week's work.

Connect Fishers and Processors: Setup of the co-op and operation in the first year is estimated at \$1,397,700. To be conservative, it is assumed that external funding will supports all start-up costs, and that these will not be shared with the operator. As the RFP for the operator is being developed, consideration should be given to a lease/purchase structure or other arrangements that reduce capital investment or recoup later, such as selling to a private entity. Future sale of the facility to a private owner is not included in the Cost Estimate, because such a decision will be based on operation of the facility and its financial health.

Explanation of specific costs include the following. Warehouse space is estimated to cost \$8 per square foot based on a search of similar 20,000-square-foot facilities in rural locations outside the influence of the Chicago metropolitan real estate market. These costs total \$160,000 per year. Office equipment and furnishings, estimated at lease rates and combined with office supplies, total \$500 per month, or \$6,000 per year. An ice machine, priced as above at \$60,000, and warehouse equipment will be needed for loading, moving, storing and other co-op operations. This equipment includes two forklifts at \$10,000 each estimated based on research of mid-range units; two scales at \$5,000 each based on information provided in the Kentucky 3-P proposal; 20 totes at \$500 each; and \$20,000 additional for miscellaneous equipment. Together, the ice machine and equipment total \$122,600. Savings may be achieved by leasing rather than purchasing fork lifts and scales. Installation of cold storage at the facility is conservatively estimated to cost \$20,000 and is dependent on the desired storage capacity, required temperature, and facility configuration in which storage will be located. Maintenance is included at \$3,000 per year. Trucking information is discussed in the Transportation section below and is assumed to be the same or similar no matter who administers the services – if standalone, as below, or managed by the co-op.

It is estimated that creation of a functional website and development of an app will cost \$150,000 with annual maintenance of \$5,000. At least four full-time staff members will be needed to establish and operate the co-op, estimated at salaries of \$80,000, \$40,000 and two at \$20,000 per year plus benefits costing an additional 40% of salary, or \$56,000, for total staff costs of \$224,000 per year. Utilities, insurance, and related miscellaneous costs are estimated at \$1,000 per month, as are other operating expenses, with an additional \$3,000 in the first year for additional unforeseen start-up costs.

Administrative costs to aid in locating a site for the facility are estimated at \$3,000, similar to costs for procuring an ice machine property location. A total of \$12,000 is estimated to conduct an RFP to secure the operator, and \$1,000 to support contract administration.

Brand and Marketing Strategy: A total of \$157,300 is estimated for the first year of marketing support. A budget of at least \$30,000 will be necessary for a marketing firm to lead stakeholders through a brand development exercise and create a budget-sensitive marketing plan to apply the brand. An annual marketing budget of \$100,000 is recommended for implementation of the brand and to support other Asian carp-related marketing. To procure a marketing firm, a total of \$13,000 will be needed to craft an RFP and administer the selection process.

Improve Transportation Infrastructure and Standards: Total transportation costs are estimated in the first year at \$608,000 and are expected to nearly double by the time the incentive is fully operational in Year 3, resulting in catches totaling 30 million pounds of Asian carp. (It is assumed that some fishers and processors will continue to transport their own fish reducing costs). Based on research conducted through Amazon for contract trucking, initial transportation of 10 million pounds of Asian carp can be accomplished over 530 trips of up to 300 miles. These trips will be made in small- to medium-sized batches of up to 12,000 pounds per trip in small box refrigerated trucks, and larger batches of up to 44,000 pounds in 53-foot refrigerated (or reefer) trailers. Costs of transportation are expected to range from \$975 to \$1,150 per trip depending on time of year, advance notice, and weekday or weekend. These trips alone are estimated to total \$537,000 in Year 1. As transportation costs increase, the co-op may transition from contract trucking to lease or purchase of trucks and in-house operation to economize. The co-

op may also charge a small fee to help defray the cost of transportation. If the incentive discussed above is implemented at the same time, a transportation charge may not result in hardship.

In addition to transportation charges, a trucking company will need to be procured, which will necessitate conducting an RFP process. This is estimated to cost \$12,000 and, as with other procurement processes, will involve composing the RFP and selection criteria, compiling and responding to questions, reviewing submittals, administering the selection process, and contracting. An additional \$1,000 per year is included for contract monitoring. Finally, as the trucking company is being procured, outreach to fishers and processors will be needed to inform them of the resource.

Current, Reliable Information on Fish Populations: It is estimated that creation of a comprehensive Asian carp database will cost \$82,500. This amount is based on level of effort to coordinate with various entities that maintain Asian carp data, expected variation in data sets, creation of a comprehensive integrated database, data population, and creation of useful presentation and analysis tools. This fish study does not require a procurement process because it can be managed under existing contracted services. A sum of \$15,000 per year is included to support ongoing data updates, maintenance, data quality control, and reporting.

ASIAN CARP IMPLEMENTATION COST ESTIMATE

1. CREATE AN INCENTIVE PROGRAM	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
10 Cents per lb as follows: Year 1 - 10,000,000 lbs; Year 2 - 20,000,000 lbs; Years 3 - 5 - 30,000,000 lbs; Years 6 - 1 incentive ramp down (Year 6 \$.07 per lb.; Year - 7 \$.04 per lb.)	\$1,000,000	\$2,000,000	\$3,000,000	\$3,000,000	\$3,000,000	\$2,100,000	\$1,200,000
Management Fee (administering agency)	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000
Annual audit	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000
Subtotal	\$107,000	\$2,107,000	\$3,107,000	\$3,107,000	\$3,107,000	\$2,207,000	\$1,307,000
Administration							
Set up of incentive administration, creation of operating procedures and forms, fee structure, IT interface, disbursement, accounting and record keeping interface, staff training.	\$8,000	\$8,000	\$8,000	\$8,000	\$8,000	\$8,000	\$8,000
RFP for auditor - RFP, selection criteria, Q&A, submittals review, selection, and contract administration	\$8,000						
Contingency (10%)	\$960	\$211,500	\$311,500	\$311,500	\$311,500	\$221,500	\$131,500
Subtotal	\$8,960	\$219,500	\$319,500	\$319,500	\$319,500	\$229,500	\$139,500
Incentive Subtotal	See Year 3.	\$2,326,500	\$3,426,500	\$3,426,500	\$3,426,500	\$2,436,500	\$1,446,500
						7-Year Total	\$17,854,200

	Per Unit	ANNUAL	START-UP TOTAL	Total	Total
2. PROVIDE ICE TO FISHERS			1 UNIT - PERM.	3 UNITS - PERM.	CONTRACT DELIVERY
Ice Machine(s)					
Ice Machine(s) - refurbished, 5 tons / day (9 months = 1,935,000 lbs)	\$60,000		\$60,000	\$180,000	
Maintenance		\$2,600	\$2,600	\$7,800	
Contract Delivery - 1,935,000 lbs					\$250,000
Property Lease - \$500 per month, per site	\$6,000	\$6,000	\$6,000	\$18,000	\$0
Structure					
Slab, building & labor	\$35,000		\$35,000	\$105,000	\$10,000
Design, permits, electrical, water & paving (assuming close electrical and water line connections)	\$25,000		\$25,000	\$75,000	\$7,000
Insurance - builder's insurance (1-time) & annual property	\$3,000	\$1,000	\$3,000	\$9,000	\$1,000
Staff - 1 pers, 9 mos, 20 hrs / wk, \$20 / hr, plus benefits (40% of sal)		\$21,672	\$21,672	\$65,016	\$65,016
Contingency (10%)		\$3,127	15,327	45,982	33,302
Subtotal		\$34,399	168,599	505,798	366,318
Administration					
Site Location and Site Control (lease, purchase, grant)			\$3,000	\$7,000	\$7,000
Ice or Machine Procurement - RFP, selection criteria, Q&A, submittals review, selection, and purchase			\$10,000	\$10,000	\$10,000
Structure Contractors RFP & Construction Administration RFP, selection criteria, Q&A, submittals review, selection, and construction administration (3 months)			\$14,400	\$36,000	
Staff Selection (1 staff) - job descr, posting, resume review; excludes screening, interviews, offer & on-boarding			\$3,000	\$6,000	
Outreach - to fishers		\$3,000	\$3,000	\$3,000	\$3,000
Contingency (10%)		\$300	\$3,340	\$5,900	\$1,700
Subtotal		\$3,300	\$36,740	\$67,900	\$21,700
Ice Machine Subtotal		\$37,700	\$205,400	\$573,698	\$388,018

Notes:

- Regulatory, and Chinese and International Coordination are excluded from cost estimates as these can be accomplished with internal resources.
- * Annual figure of \$1,074,000 assumes full incentive implementation and delivery of 20,000,000 lbs per year, and remaining 10,000,000 lbs delivered independently.
- Costs of items reflected in yellow are assumed to be performed by external consulting firm contracted to support Asian carp management
- Red outlined items were summed for Year 1 total. These items were selected for their cost effectiveness and ability to affect change. Trucking and related contingency counted only once in TOTALS.
- Thick black outlined figures indicate annual costs. Figures not outlined as such are omitted from total figure. Trucking and related contingency counted only once in TOTALS.

	Per Month	Per Year	Total	Total
3. CONNECT FISHERS AND PROCESSORS			OFFICE & WAREHOUSE	OFFICE ONLY
Office Space - \$11 psf, 2,000 sf, Class B	\$1,833	\$22,000		\$22,000
Warehouse - 20,000 sf, \$8 psf		\$160,000	\$160,000	
Office Equipment, supplies	\$500	\$6,000	\$6,000	\$6,000
Warehouse Equipment - ice machine (1, \$60,000) and maintenance, fork lifts (2, \$10,000 each), scales (2, \$5,000 each), totes (20, \$500 each), etc.		\$2,600	\$122,600	
Cold Storage		\$3,000	\$23,000	
Trucking * - approx 530 trips, \$975 - \$1,150 / trip, deliv 10,000,000 lbs		\$1,074,000	\$537,000	
IT - website, mobile app, etc.		\$5,000	\$155,000	\$155,000
Staff - 4 people, FT, (\$80k, \$40k & 2 at \$20k per year), incl. benefits (40% of salary)	\$18,667	\$224,000	\$224,000	\$168,000
Utilities, Insurance, misc	\$1,000	\$12,000	\$12,000	\$12,000
Other Operating	\$1,000	\$12,000	\$15,000	\$12,000
Contingency (10%)		\$149,860	\$125,460	\$37,500
Subtotal		\$1,648,460	\$1,380,060	\$412,500
Administration				
Site Location			\$3,000	\$3,000
RFP for Co-op Operators - RFP, selection criteria, Q&A, submittals review, interviews, selection, and contract administration		\$1,000	\$13,000	\$13,000
Contingency (10%)		\$100	\$1,600	\$1,600
Subtotal		\$1,100	\$17,600	\$17,600
Co-op Subtotal		\$1,649,600	\$1,397,700	\$430,100
4. DEVELOP BRAND AND MARKETING STRATEGY				
Brand creation, strategy, limited marketing assets			\$30,000	
Marketing		\$100,000	\$100,000	
Contingency (10%)		\$10,000	\$13,000	
Subtotal		\$110,000	\$143,000	
Administration				
RFP for marketing firm - RFP, selection criteria, Q&A, submittals review, selection, and contract administration			\$13,000	
Contingency (10%)			\$1,300	
Subtotal			\$14,300	
Brand and Marketing Subtotal		\$110,000	\$157,300	

Notes:

Regulatory, and Chinese and International Coordination are excluded from cost estimates as these can be accomplished with internal resources.

* Annual figure of \$1,074,000 assumes full incentive implementation and delivery of 20,000,000 lbs per year, and remaining 10,000,000 lbs delivered independently.

Costs of items reflected in yellow are assumed to be performed by external consulting firm contracted to support Asian carp management.

Red outlined items were summed for Year 1 total. These items were selected for their cost effectiveness and ability to affect change.

Trucking and related contingency counted only once in TOTALS.

Thick black outlined figures indicate annual costs. Figures not outlined as such are omitted from total figure.

Trucking and related contingency counted only once in TOTALS.

5. IMPROVE TRANSPORTATION INFRASTRUCTURE AND STANDARDS			
Trucking * - approx 530 trips, \$975 - \$1,150 / trip, deliv 10,000,000 lbs		\$1,074,000	\$537,000
Contingency (10%)		\$107,400	\$53,700
Subtotal		\$1,181,400	\$590,700
Administration			
RFP for trucking firm - RFP, selection criteria, Q&A, submittals review, selection, and contract administration		\$1,000	\$13,000
Outreach - to fishers and processors			\$3,000
Contingency (10%)		\$100	\$1,300
Subtotal		\$1,100	\$17,300
Transportation and Standards Subtotal		\$1,182,500	\$608,000
6. PROVIDE CURRENT, RELIABLE INFORMATION ON FISH POPULATIONS			
Integration of existing governmental fish databases into single carp database; annual maintenance, updating and analysis		\$15,000	\$75,000
Contingency (10%)		\$150	\$7,500
Information on Fish Populations Subtotal		\$15,150	\$82,500
TOTALS		\$5,240,050	\$3,225,350

Notes:

Regulatory, and Chinese and International Coordination are excluded from cost estimates as these can be accomplished with internal resources.

* Annual figure of \$1,074,000 assumes full incentive implementation and delivery of 20,000,000 lbs per year, and remaining 10,000,000 lbs delivered independently.

Costs of items reflected in yellow are assumed to be performed by external consulting firm contracted to support Asian carp management.

Red outlined items were summed for Year 1 total. These items were selected for their cost effectiveness and ability to affect change. Trucking and related contingency counted only once in TOTALS.

Thick black outlined figures indicate annual costs. Figures not outlined as such are omitted from total figure. Trucking and related contingency counted only once in TOTALS.

Measurement Metrics

Establishing measurement metrics at the outset of any project is essential to evaluating its success, to correct weaknesses as the project advances, and aid in adjusting to new conditions. A number of metrics present themselves for the various actions recommended in this report. These are reflected in the chart on the following page by implementation action, with recommended frequency and collection units. Others may be added or removed depending on relevance, as the project progresses. Certain metrics cannot be determined until further action is taken on the recommendation, such as marketing metrics for which a strategy must first be crafted. These are noted in italics as *to be determined*.

METRICS					
IMPLEMENTATION ACTIONS	Frequency 1	Frequency 2	Frequency 3	Units 1	Units 2
Create an Incentive Program					
Disbursement	Weekly	Monthly	Annually	Aggregate \$	By Company \$
Carp Sold	Weekly	Monthly	Annually	Aggregate Lbs	Lbs By Company
Carp Types Sold	Weekly	Monthly	Annually	Aggregate Lbs	Lbs By Company
Provide Ice to Fishers					
Ice Made	Weekly	Monthly	Annually	Aggregate Lbs	
Ice Distributed	Weekly	Monthly	Annually	Aggregate Lbs	
Maintenance Costs		Monthly	Annually	Dollars	
Sales (if applicable)	Weekly	Monthly	Annually	Dollars	
Connect Fishers and Processors ¹					
Carp Bought	Weekly	Monthly	Annually	Aggregate Lbs	Lbs By Fisher
Carp Types Bought	Weekly	Monthly	Annually	Aggregate Lbs	Lbs By Fisher
Carp Sold	Weekly	Monthly	Annually	Aggregate Lbs	Lbs By Company
Carp Types Sold	Weekly	Monthly	Annually	Aggregate Lbs	Lbs By Company
Prices Sold	Weekly	Monthly	Annually	Aggregate Lbs	By Carp Type
Carp Cold Storage	Weekly	Monthly	Annually	Aggregate Lbs	By Carp Type
Develop Brand and Marketing Strategy					
<i>To be determined with marketing strategy development</i>					
Improve Transportation Infrastructure and Standards					
Trips	Weekly	Monthly	Annually	Miles	Locations To & From
Travel Times	Weekly	Monthly	Annually	Hours	
Cost per Mile	Weekly	Monthly	Annually	Dollars	
Transport Temperatures	Weekly	Monthly	Annually	Fahrenheit	
Standards Noncompliance	Weekly	Monthly	Annually	Number	Standards Violated
Create Dialogue About Regulatory Considerations					
Challenges Identified			Annually	Number	
Milestones		Monthly	Annually	Description	
Feedback from targeted beneficiary	<i>To be determined based on nature of challenge</i>			Description	
Other metrics to be determined					
Provide Current, Reliable Information on Fish Populations					
Carp Populations Structure		Monthly	Annually	Carp Type	
Carp Location		Monthly	Annually	Carp Type	By Pool or Less
Carp Movement		Monthly	Annually	Carp Type	By Pool or Less
Largescale Temporal Trends	<i>To be determined based on nature of study</i>				
Capture Rates	Weekly	Monthly	Annually	Carp Type	By Pool or Less
External factor correlation (climate, water quality, flow)	<i>To be determined based on nature of study</i>				
Other metrics to be determined					
Engage SMEs in Chinese and Other International Markets					
Number of inquiries handled		Monthly	Annually	Number	
County of origin		Monthly	Annually	Country	
Actions taken	Weekly	Monthly		Description	
Disposition		Monthly	Annually	Description	

¹ Assumes co-op with cold storage, website, app, and inspection. Transportation metrics reflected under Transportation and Standards item.



APPENDIX A

Annotated Bibliography

Asian Carp Regional Coordinating Committee. 2013. FY 2013 Asian Carp Control Strategy Framework Action Items, Appendix B, Action 2.2.3: Investigation of Certification Requirements for Asian Carp Usage. July 2013 Draft.

Outlines a project to be led by Illinois Department of Natural Resources (DNR) in collaboration with U.S. Agency for International Development (USAID) to document the suitability of Asian carp from the Illinois and Mississippi rivers for human consumption. The expected outcome of the project is to identify partners and workable pathways to get packaged food into the international aid pipeline. Potential hurdles include the following: ability to supply fish in quantities desired, ability to support both domestic and international needs, identification and provision of proper and suitable packaging for fish to be welcomed and used in USAID, and increased costs of logistics/transportation of high-quality protein.

Asian Carp Regional Coordinating Committee. 2014. 2014 Asian Carp Control Strategy Framework Action Items, Appendix B, Action 8.4: Investigation of Certification Requirements for Asian Carp Usage.

Outlines a project to be led by Illinois DNR in collaboration with U.S. Agency for International Development (USAID), Illinois DNR-Tagey Hunger Now, and Southern Illinois University (SIU) to investigate the certification requirements for Asian carp usage as a human food source. The expected outcome of the project is to identify partners and workable pathways to get packaged food into the international aid or domestic aid pipeline. Several actions toward this goal have been conducted or are ongoing, including communicating results of the contaminant study and demonstrating Asian carp food products at the Illinois State Fair. Potential hurdles include the following: ability to supply fish in quantities desired, ability to support both domestic and international needs, identification and provision of proper and suitable packaging for fish to be welcomed and used in USAID, increased costs of logistics/transportation of high-quality protein, increase in need for quality protein and fish products, and continued need for quality fish meal, feeds and oils.

Associated Press. 2015. "Asian carp could be on menu at University of Missouri." KOMU. February 14. Online Address: <http://www.komu.com/news/asian-carp-could-be-on-menu-at-university-of-missouri/>

The University of Missouri has considered adding Asian carp to the menus of their dining halls. The University had students try the fish and recorded their reactions for the culinary staff to make the decision on whether or not to serve the fish. This would be the first university in the nation to serve the fish to students, which would help create a market for this invasive species.

Astrouski, Joe. 2016. "Fighting the Fish: Part 1." WAND. August 22. Online Address: <http://www.wandtv.com/story/32809565/fighting-the-fish-part-1>

In August, two workers from the Illinois Department of Natural Resources (DNR) launched a boat into the Illinois River outfitted with electrofishing equipment. They were surveying the populations in La Grange Reach, which is seen as the bullseye of the U.S. carp population. Asian carp were brought to the United States to reduce algae loads in catfish ponds in order to create a healthier, better tasting catfish; however, the carp found their way into rivers, such as the Mississippi, Wabash, Illinois, and Ohio, where they thrive as plankton eaters. Two main goals of the Illinois DNR are keeping the fish from reaching the Great Lakes, while reducing their numbers downstream. This will be a multifaceted approach involving food workers, scientists, and fishers in Illinois and overseas.

Astrouski, Joe. 2016. "Fighting the Fish: Part 2." WAND. August 23. Online Address: <http://www.wandtv.com/story/32819649/fighting-the-fish-part-2>

With the help from the Illinois Department of Natural Resources (DNR), a group of commercial fishers gathered on the Illinois River to employ a new method to catch a large quantity of Asian carp at one time.

The fishers laid trammel nets and gill nets, and then proceeded to rev their engines, banking their boats along shorelines, and banging on the sides of their boats with golf clubs in an attempt to scare as many carp as possible into the nets. To develop this method, the Illinois DNR met with fishers from the United States and China. This method has proven successful; one of the fisherman stated that 6,000 pounds of carp could be removed by one boat in one day, and one worker for Illinois DNR stated that fisherman have used it to remove 80 percent of the carp from one lake. Challenges facing fishers and

Astrouski, Joe. 2016. "Fighting the Fish: Part 3." *WAND*. August 24. Online Address:
<http://www.wandtv.com/story/32819649/fighting-the-fish-part-3>

People working on the mitigation of the Asian carp populations believe the tastiness of the fish is critical to the success of any mitigation program. A chef from Baton Rouge stated that eradication of the Asian carp populations will not be possible due to their abundance and wide- reaching range. Sustainable and profitable commercial harvest is the only other feasible option. The chef also stated that the fish will find limited success in grocery stores due to their name and being a bony fish; however, the commercial food industry, restaurants, caterers, cruise liners, etc., could find a huge market for the product. Additionally, he stated that the demand of fish continues to rise, while the supply is decreasing due to restrictions and overharvest. This will provide an opportunity for a new type of fish to enter the market.

Boncy, Alexis. 2016. "Want to get rid of invasive species? Eat them." *TheWeek*. October 3. On-Line Address:
<http://theweek.com/articles/652051/want-rid-invasive-species-eat>

There is a growing trend of "culinary conservation: using invasive animals to cook sustainably." This trend is being embraced by a number of restaurants and includes preparation of Asian carp. In Kentucky, Asian carp generally cost half the price per pound when compared to more traditional fish and the state pays a 5-cent-per-pound incentive to commercial fisherman for Asian carp catches. Organizations, including Eat the Invaders, Invasivore.org, and the Institute for Applied Ecology's Eradication by Mastication also have campaigns that encourage and support the culinary conservation trend.

Bouska, Wesley, David Glover, Jesse Trushenski, Silvia Secchi, and James Garvey. No date. "Initiating large-scale commercial harvest as a bigheaded carp control measure: successes, failures, and population responses. Draft.

Commercial harvest experiments were conducted on bighead carp to evaluate the population responses and identify limiting factors that could affect success of the approach. Two different approaches provided incentives were to fishers for direct-consumption and set a harvest quota for indirect consumption. The incentive programs did not produce significant results, and over the 4- month study, 1.5 million kg of bighead carp were removed using the set-quota approach. About 60 percent of the harvest occurred in the river reach nearest to the processing plant, and major decline in catch rates were observed the next year. The low number of processing plants will constrain future harvests to specific areas because of lower costs to transport fish to the plants; as you move farther away from plants, the incentive to fish Asian carp may not result in as great of a financial benefit.

Chang, Lyu. 2015. "Seafood industry adapts to market changes." *Zhanjiang China*. July 22. Online Address:
http://www.chinadaily.com.cn/m/quangdong/zhanjiang/2015-07/22/content_21367802.htm

China's seafood industry has seen a decline as a result of declining demand and rising labor costs. Zhanjiang must look to transform the industry by incorporating more value-added products. Instead of selling raw products, the company is investing in processing products, including breaded shrimp and tilapia. The industry is moving away from being only a raw seafood exporter and welcoming seafood product processing companies.

Charlier, Tom. 2016. "Floating factory would process Asian carp." *The Commercial Appeal*. December 27. Online Address: <http://www.commercialappeal.com/story/news/environment/2016/12/27/floating-factory-would-process-asian-carp/95702032/>

Riverine Fisheries International is expected to start processing Asian carp in February after the U.S. Army Corps of Engineers approves a permit under the Rivers & Harbors Act for a vessel that will serve as a fish factory to moor at the Port of Cates Landing in Tennessee. The \$18 million venture is expected to employ 100 people and include: catcher vessels, warehouses, and administrative headquarters. Carp will come from a 400-mile radius, delivered to the vessel by truck, where fish will be minced, gutted, split, and distributed to 20 countries, including China and Russia. Augusta Fisheries, located in Tennessee, processes and freezes Asian carp for export.

Downs, Jere. 2016. "Invasive Asian carp leaps onto restaurant tables." *USA Today Network: The Louisville, Ky.) Courier-Journal*. September 27. Online Address: http://easybtn-stage.usatoday.com/story/news/nation-now/2016/09/27/invasive-asian-carp-leaps-onto-restaurant-tables/91184264/#abTestId=66&abTestVariant=cx_mp&bucket=content-override&pinType=backfill&assetPosition=4&navSource=hedgrid_4

A number of fine dining establishments in Kentucky are serving Asian carp. Carp can be prepared in a variety of ways including: grilled, fried, blackened, buffalo style, and sashimi. Carp are white and meaty, neutral, clean, and low in mercury. The taste is similar to scallops, Chilean sea bass, and other white fish, such as grouper, halibut, snapper, walleye, and striped bass. However the cost per pound can be significantly less. Sea bass may be \$23 a pound, while carp is \$10. Fin Gourmet has been selling 20,000 pounds of boneless fillets per week to restaurants in Louisville, Chicago, Nashville, New Orleans, and Las Vegas. Asian carp are an average of 45 to 70 pounds each and prolific breeders and can grow up to 1 foot per year. This can result in carp outcompeting native fish. To help combat this, Southern Illinois University (SIU) paid fisherman \$100 per black carp and the State of Kentucky paid 5 cents per pound. These programs helped remove as much as two-thirds of carp in the upper Illinois River to the coast of Lake Michigan.

Eat Mo Carp. No date. Flyer and menu for Take a BITE out of Carp.

Poster for a carp festival in Columbia, Missouri. The poster explains that the silver carp is an invasive species, and detrimental to the waterways of the Mississippi River. The festival aims to increase popularity of the fish for consumption.

Focus Forward Central Illinois. No date. "Illinois River Asian Carp: Market Driven Solution."

Focus Forward Central Illinois (FFCI) is a "top-down/bottom up asset-based economic development initiative" focused on the development of market opportunities for Asian carp that also reduce carp populations in Central Illinois counties, including Mason, Logan, Peoria, Tazewell, and Woodford. Previous studies have identified harvest as a solution to managing invasive Asian carp, but no such market driven solutions have been developed. This project is focused on the production of high value, significant margin products for human and non-human markets and includes four elements: Harvest Methods, Technology and Fisherman Development, Handling and Value Added Processing, Market Conditioning and Events, and Research and Development. Several actions have been completed or are underway including the CARPe diem, CARPe CARPiO summit, continued communication with value chain participants, product research including human (smoked spread, jerky, etc.) and non-human (fertilizer and fish meal) product preservation and conservation events, and products development by local companies.

Garvey, James E., Greg G. Sass, Jesse Trushenski, David Glover, Patrice M. Charlesbois, Jeff Levensgood, Brian Roth, George Whittedge, Brian C. Small, Sara J. Tripp, and Silvia Secchi. 2012. "Fishing Down the Bighead and Silver Carps: Reducing the Risk of Invasion to the Great Lakes." Final Draft 1 March 2012.

Populations of Asian carp have been growing in the lower and middle Illinois River and are approaching the Chicago Area Waterway System and the defensive electrical barrier. As the populations grow and migrate, they will eventually invade the Great Lakes. This report primarily discusses results of various research studies. Asian carp comprised 63 percent of the total invasive and native fish biomass in the study area along the Illinois River. Asian carp is high in protein and healthy fats, with many fish recording low levels of contaminants; however, some of the fish captured contained contaminant levels that warranted a human limit to consumption. Research showed a market for the fish, but the infrastructure of the area was not developed enough to support the market, which was determined to be the primary factor inhibiting development of Asian carp and native fish products. Research showed the densities and biomass in the Illinois River were high; however, they are smaller than other fisheries found around the world that have collapsed. It is believed that the harvest could be managed with fishing and control methods.

Garvey, James E., Greg G. Sass, Jesse Trushenski, David Glover, Marybeth K. Brey, Patrice M. Charlesbois, Jeff Levensgood, Brian Roth, Greg Whittedge, Silvia Secchi, Wesley Bouska, Ruairi MacNamara, Brian C. Small, Sara J. Tripp, Andrew F. Casper, James Lames, Sarah Varble, Rich M. Pendleton, Collin J. Hinz, Jason A. DeBoer, and Mark W. Fritts. 2015. "Fishing Down the Bighead and Silver Carps: Reducing the Risk of Invasion to the Great Lakes." Final Report January 2015.

Populations of Asian carp have been growing in the lower and middle Illinois River and are approaching the Chicago Area Waterway System and the defensive electrical barrier. As the populations grow and migrate, they will eventually invade the Great Lakes. This report covers a variety of research questions regarding the ecology, fish nutrition, and marketing aspects for harvesting Asian carp to control their populations in the Illinois River. The research has led to eight published journal articles, as of 2015. In 2012, nearly 2 million pounds of carp were removed from the lower river, which led to a greater abundance of smaller mean length-at-age carp across multiple age classes and of hybridization of bighead and silver carp. Controlled commercial fishing of Asian carp did not have a significant influence on the ecological health of the river system. The nutritional content of Asian carp was similar in protein content to marine fish, while the total oil content was lower. Methylmercury and PCBs were present in sufficiently high levels to limit meals to sensitive human cohorts; however, levels were still below the U.S. Food and Drug Administration (FDA) action levels. Marketing surveys have shown that contaminants in the fish were the main consumer concern of pursuing commercial harvesting of Asian carp.

Grimm, Nathan. 2014. "Simon tours Grafton fish plant, 'It's really a great solution for everyone but the carp.'" *The Telegraph*. August 11.

The Lieutenant Governor of Illinois toured the American Heartland Fish Products plant in Grafton, Illinois, which is the only plant in the state exclusively licensed to render Asian carp. At full capacity, the plant is expected to employ 35 people, process 40,000 pounds of carp per day, and remove 7,600 tons of carp from waterways each year. The plant makes fish meal, bone meal, and Omega 3 fish oil. The company is looking into opening another plant in Metropolis, Illinois, on the Ohio River.

Hallesy, Terri. 2016. "Peoria students get up to date on Asian carp." Sea Grant Illinois-Indiana. May 2. On-Line Address: <http://www.iiseagrant.org/newsroom/peoria-students-get-up-to-date-on-asian-carp/>

The Sun Foundation holds an annual Clean Water Celebration at the Peoria Civic Center; the gathering is used to encourage students and the public about water quality and conservation. The Illinois-Indiana Sea Grant hosted its "Stop Asian Carp in Their Tracks" activity, along with showing a video about Asian carp in

Illinois and showcasing their website, "Nab the Aquatic Invader." Students were educated on the origins of Asian carp and the trouble caused by this invasive species; overall, students gained an understanding of the role invasive species play in a foreign ecosystem and how the public can work to stop the spread of these species.

Hitchens, Paul. 2013. "Asian Carp for Humanitarian Purposes: FAS/USAID Data." Southern Illinois University, Carbondale: Center for Fisheries Aquaculture & Aquatic Sciences. February 25.

This fact sheet details the environmental issues regarding the spread of Asian carp throughout multiple states, with Illinois being the most affected; and also provides information on the fishery program for the Center for Fisheries, Aquaculture, and Aquatic Sciences at Southern Illinois University (SIU). Asian carp is a large fish (20-30 pounds) that consumes more than 10 percent of their body weight per day, and spawn multiple times a year, producing millions of eggs. Studies showed that the silver carp comprised of 76 percent of the total estimated biomass of Asian carp (3.1 million pounds) in the lower reaches of the Illinois River; it is possible that their populations in backwater lakes, side channels, and tributaries are about equal to this, which would double the estimated biomass of Asian carp. Various Asian carp species have established reproducing populations in 20 states (including Hawaii). Using management practices, estimates show the carp population would not collapse over a 25-year period in the Illinois River. The fact sheet details "Asian Carp Processing Information & Cost" for shipping and purchasing various carp products, including ground fish, bologna, or hot dogs. It also details the composition, nutrition, and contaminant values for the bighead and silver carp (moisture content, protein, lipid, ash, PUFA, LC-PUFA).

Illinois Department of Natural Resources (Illinois DNR). No date. Request for Asian Carp Processing and Technology Development Assistance. Unpublished.

Project was submitted by Illinois DNR in collaboration with the Greater Peoria Economic Development Council (Council) and Southern Illinois University (SIU). Funds of \$400,000 were requested from FY 2016 to FY 2018. Project funding would be used to seek expert advice for the council and other public/private stakeholders to "review proposals, and assist in development of facilities, identifying locations and needs for the development of appropriate industry to assist in a broader removal of Asian Carp from the river." Specifically, the funds would be used to obtain contract support to help position business investments and to access new and leading technologies in the fish processing business.

Lassiter, Lesley. 2016. "Now Appearing On Your Menu...Asian Carp?" *Nashville Scene*. September 22. Online Address: <http://www.nashvillescene.com/food-drink/features/article/20834504/now-appearing-on-your-menu-asian-carp>

Restaurants in Nashville are experimenting with serving carp. It is difficult for consumers to move past the perception that carp is a "trash" fish, but this is erroneously based on confusion with European carp. Asian carp has a "pleasant, mild" flavor, is highly nutritious (only wild caught salmon has more protein), and is low in mercury and lead. Asian carp is eaten all over the world and farmed in Asia. It has been harvested for fish sticks, imitation crab, pet food, and fertilizer. The price per pound serves as a disincentive for fishing for the carp because the price is typically at about one-fifth other common catches. In addition, it is difficult to process and serve due to the high number of bones and tough skin, which is used as leather in some parts of the world. Companies, such as FIn Gourmet Foods are working to create a market at the urging of fishers in Kentucky. The company has developed a process to debone the fish and is working on producing fillets and surimi and uses the leftovers for fish meal and fertilizer. Another advantage is that Asian carp can be marketed as wild-caught and sustainable.

Luciano, Phil. 2016. "Luciano: Is an Asian carp plant just a fish tale?" *Journal Star*. August 8. Online Address: <http://www.pjstar.com/news/20160808/luciano-is-asian-carp-plant-just-fish-tale>

For years, complications have halted progress to establish an Asian carp processing plant in central Illinois. Multiple attempts have been made; however, they were met with roadblocks that impeded their progress. Kencor Ethnic Food, based in Wisconsin, plans to relocate to South Peoria, Illinois, after a failed attempt in Havana, Illinois. Citizens and officials in Havana complained over reports of a plant in Grafton that produced a bad smell from roasting and processing Asian carp; however, Kencor plans to only freeze Asian carp for shipping, which would not produce a similar scent. Kencor currently does about \$800,000 a year in catfish sales, and believes it could double that with Asian carp. Another plant was set to open in May 2016, but delays pushed back the sale of the property and created more hurdles for the business.

MacNamara, Ruairí, David Glover, James Garvey, Wesley Bouska, and Kevin Irons. 2015. "Bigheaded carps (*Hypophthalmichthys* spp.) at the edge of their invaded range: using hydroacoustics to assess population parameters and the efficacy of harvest as a control strategy in a large North American river." *Biological Invasions*. November 2016. Volume 18, Issue 11. Pages 3293 through 3307. DOI: 10.1007/s10530-016-1220-4

Samples were conducted between 2012 and 2015 in the upper portion of a river to help quantify demographics and evaluate harvest efficacy. The samples were used to determine reach-specific densities, size structures, and species compositions, which all varied inter-annually. The upper river population front was dominated by bighead carp, while downstream, high densities of silver carp were common. Between 2012 and 2013, bighead carp decreased by 40 percent; however, between 2013 and 2014, the population remained stable despite the annual harvest more than doubling. Over the sample period, the densities initially declined and then remained at a stable level, while the population front did not expand. Other external factors, including hydrological variability and environmental conditions, could have a major impact on the population extent. Harvest resources may come under pressure during years with high discharge, strong-year-class, and/or successful recruitment.

Maher, Rob. No date. "Trends in Reported Commercial Fish Harvest in the State of Illinois from 1950 to 2015." PowerPoint Presentation.

Early harvest records indicate that large volumes of fish were once harvested; specifically, in 1908 more than 2,000 commercial fishers harvested more than 20 million pounds of fish. Over time, the number of commercial fishers in Illinois has declined. In 1985, 71 individuals reported their catch as full-time fishers, and by 2015, only 40 reported their catch as such. Despite the decline in the number of fisherman, improvements in tackle, the size of boats, and influx of Asian carp, have increased the overall harvest quantities. Buffalo fish remains more profitable than Asian carp, even though higher quantities of Asian carp are being harvested. Bighead and silver carp are the most heavily harvested, while common carp harvests have decreased. The harvest of grass carp is steadily increasing.

Marketwired. 2016. "BareItAll Petfoods Wins National Best Brand Award by the American Choice Awards." *Digital Journal*. September 21. Online Address: <http://www.digitaljournal.com/pr/3078825>

BareItAll Petfoods, "saving the environment one dog at a time," was awarded the National Best Brand Award in the All Natural Pet nutrition category from the American Choice Awards. The company offers goBare dog treats that combine Asian carp with other natural ingredients. They claim that the Asian carp component offers "the same nutritional benefits of salmon without high levels of mercury."

Moon, Jill. 2016. "City strikes deal over business-grant default." *Journal Courier*. August 22.

The City of Grafton, Illinois, made a \$50,000 payment to the State of Illinois after a fish processing plant, American Heartland Fish Products, dissolved and defaulted on payments to the city for a \$250,000 economic incentive program loan from the state. The plant was causing odor problems in Grafton and the facility is now being run by a group from China that flash freezes the carp and exports them to Asia. As part of the development of the facility, a tax increment financing (TIF) district was established, North Grafton TIF, and approximately \$400,000 in infrastructure investments were made in the area.

Morgan, Mark. 2016. "'Carpe Carpam': Conservation Through Gastronomy." *Parks & Recreation*. January 2016. Pages 42 through 43.

Asian carp were brought into Arkansas in the 1970s to control algae and improve water quality in fish farms, but populations made their way into the river systems after a flood. The fish outcompeted native fish species due to their size, and massive die-offs created an undesirable sight that deterred tourism. Mark Morgan developed "Eat Mo Carp," which is a marketing-based strategy to increase interest in Asian carp in grocery stores and restaurants. Utilizing Asian carp promotes environment health and the economy. Taste tests at the University of Missouri, which now serves the fish in its dining halls, found the students preferred the carp to catfish. Other locations, including Moser's Supermarket and Broadway Brewery in Columbia, Missouri, have begun selling Asian carp products and even host events with Mark Morgan to promote the fish.

Nuñez, Martin A. Sara Kebbing, Romina D. Dimarco, & Daniel Simberloff. 2012. "Invasive Species: to eat or not to eat, that is the question." *Conservation Letter*. Volume 5. Pages 334 through 341. doi: 10.1111/j.1755-263X.2012.00250.x

The idea of controlling invasive species through human consumption is not a new idea, but one that is gaining popularity. The authors note several benefits to this approach, including increased awareness, potential assistance in early detection and rapid response efforts, and positive effects for a local economy. In addition to these benefits, the authors note challenges and unintended consequences that may result, including failing to affect invader population size, expansion, or growth; creating a market for an invasive may prove to be a disincentive for eradication; encouraging further spread; and incorporating the species into the local culture. The authors suggest that gastronomy-based efforts may be most successful if the population size is low, the appropriate life-stage is targeted, and consumers are frequently reminded of eradication goals.

Pasko, Susan and Jason Goldberg. 2014. "Review of harvest incentives to control invasive species." *Management of Biological Invasions*. Volume 5, Issue 3. Pages 263 through 277. <http://dx.doi.org/10.3391/mbi.2014.5.3.10>

Various harvest incentives for invasive species include, bounty programs, which provide a predetermined amount of money to an individual for collecting the specified species; contract operation, which pays the public or a service provider to remove the species; commercial market, which is the use of the harvested species for sale; and recreational harvest, which includes encouraging hunting, fishing, or trapping of the species. The use of these programs may help support the native environment, while also supporting economic development. Many factors must be looked at to determine the potential for success of an incentive program; these include population dynamics, biological overcompensation, species dispersal and occupied range, native ecological consequences of invasive removal, human health considerations, socioeconomic objectives and consequences, government intervention, and public outreach. This study describes the limitations of these programs, as there are few case studies demonstrating the success of their use for control or eradication. The study offered 11 recommendations for incentivized harvest

programs: (1) Define the management plan and objectives, (2) understand the costs, (3) understand the target species' population dynamics, (4) consider risks to human health and safety, (5) evaluate potential ecological outcomes, (6) monitor for unintended outcomes, (7) prevent re-introduction, (8) incorporate adaptive management, (9) conduct outreach, (10) restore impacted areas, and (11) determine appropriate points for government intervention.

Robinson, Peter. 2017. "Get Rich. Save the World. Gut Fish, venture capitalists Ross Baird has a radical plan to turn invasive Asian carp into American industry." *Bloomberg Business Week*. January 19.

Ross Baird and his fund, Village Capital, have been investing in businesses in areas of economic distress in the United States. He believes that these areas of persistent joblessness and decreasing quality of life contain the talent and base for successful businesses to revitalize the areas; however, the capital needed to be successful is not there. Fin Gourmet Foods in Paducah, Kentucky, a company supported by Baird, buys Asian carp from local fishers and processes them to create boneless filets. The company is forecasted to generate revenues in excess of \$1.5 million in 2017, which is nearly 5 times as much revenue as reported in 2016. Initially, Lula Luu and John Crilly, founders of Fin Gourmet, started the business by developing a fish paste, common in Vietnamese fish cakes, called surimi. Unfortunately, the Chinese markets were able to develop the product far cheaper than Luu and Crilly could, and the business could not take off. In 2014, Village Capital hosted a 3-month training program for agriculture startups in Louisville, where Fin Gourmet was one of two companies that received capital from the fund. The company, with the help of Andre Ragu, a New York-based consultant who provided support to companies to develop sustainable supply chains, then went on to partner with Chinese investors and local fisherman to develop the Blue Shore Fishery, which would employ 66 people and sell 100,000 pounds of Asian carp a day to overseas buyers. However, a series of complications led to Blue Shore suing Fin Gourmet for breach of contract, fraud, and breach of fiduciary duties, to which Fin Gourmet then sued Blue Shore for defamation. The companies have since separated and Fin Gourmet employs 15 employees at their processing facility. The story of this company shows the troubles and hardships of developing successful businesses in distressed regions that may deter investors.

Schneller, Keith. 2016. Cochran Fellowship Program: Chinese Seafood Processors – Asian Carp Study Tour. PowerPoint presentation of Final Report. October 31.

The U.S. Department of Agriculture (USDA) Agricultural Trade Office in Beijing conducted a study program, which allowed a group of Chinese seafood processors to survey the Asian carp problem in the United States. The study included a boat tour from Jackson, Mississippi, to Chicago Illinois. The goal was to discuss ways for the U.S. to increase demand of the fish in order to control its spread. Overall, the team believe the U.S. government must educate the public about the nutritional qualities of the fish and dispel the belief of the fish as a bottom feeder or "trash" fish to generate a viable market. Efforts to create a market for the carp, to control or eradicate the population, have been met with hope to reinvigorate the U.S. river fishing industry that dissipated decades ago. Efforts must also be made to educate Chinese populations that wild-caught U.S. carp are clean and healthy to eat. An effort should also be made to convince the Chinese to purchase frozen products imported from the U.S. The Chinese offered different harvesting methods for the often-difficult-to-catch species. The Kentucky Department of Fish & Wildlife Resources (KDFWR) also proposed a central, cold storage facility for local fisherman to deliver their catch for future transport to processing plants to aid in the supply chain. Recommendations after the tour included USDA conducting seminars with Chinese processors to educate them on the high quality of U.S. Asian carp, coordinate American and Chinese media teams to participate in a U.S. carp tour to learn about the clean, healthy, and nutritious Asian carp found in U.S. waters, work with Chinese seafood processors to lower or eliminate duty on U.S. imported carp, provide tax and other incentives to companies to encourage

development of the river fishing supply chain, and coordinate carp booths at major international seafood shows in the United States (Boston), Europe (Brussels) and China (Qingdao) in 2017.

Tarter, Steve. 2016. "Proposed Peoria plant prefers catfish, open to Asian carp." *Peoria Journal Star*. August 25.

Kencor Ethnic Foods received approval from the Peoria (Illinois) City Council for a commercial fish processing facility in Peoria. The plant, owned by Morgan and Jean Enowmbitang, is relatively small and will hire 12 to 15 people rather quickly after needed updates. Kencor's main focus is on catfish for its African-style smoked, dried product line, but the company will process some Asian carp to be used to supplement catfish scraps to make dog treats. Asian carp is seen as an area of potential growth for the company, which has operated in Kenosha, Wisconsin, since 2004.

Tsehaye, Iyob, Matthew Catalano, Greg Sass, David Glover & Brian Roth. 2013. "Prospects for Fishery-Induced Collapse of Invasive Asian Carp in the Illinois River." *Fisheries*. Volume 38, Number 10. Pages 445 through 454, DOI: 10.1080/03632415.2013.836501

As part of an effort to control invasive Asian carp populations, Illinois developed a fishing program to encourage intensive commercial exploitation. Additionally, the Illinois Chamber of Commerce and Economic Opportunity signed a 2010 agreement to provide 13.6 to 22.7 million kg (about 30 to 50 million pounds) of carp annually to China. This study examines harvest policies and exploitation rates necessary to collapse the invasive populations. The study found that the strategies of non-size selection (meaning a wider range of fish captured, rather than simply mature fish) and increased targeting of silver carp versus bighead carp were best able to achieve targets. In order to promote these strategies, economic incentives should be skewed toward targeting smaller fish and silver carp, rather than bighead carp. The authors note that Southern Illinois University (SIU) started an incentive-based pilot program encouraging capture of Asian carp of all sizes for conversion to fish meal. The authors further note that including information on the temporal and spatial distribution of carp would likely improve the effectiveness of removal strategies.

Undercurrent News. 2016. "Zhanjiang Guolian to spend \$72m on new shrimp farms in southern China." *Undercurrent news*. August 22. Online Address:

<https://www.undercurrentnews.com/2016/08/22/zhanjiang-guolian-to-spend-72m-on-new-shrimp-farms-in-southern-china/>

Zhanjiang Guolian Aquatic Products, a Chinese company, will invest CNY (Chinese Yuan) 480 million (\$72.5 million U.S. dollars) to develop three closed-system penaeid shrimp farms. Two of the farms will be built in Guangdong Province and the other will be in Hainan Province. The project is expected to have a 3.1-year investment pay-back period. Automatic and digital systems will be installed to monitor the farming environment and ensure an ideal place for shrimp growth. The project will allow the company to expand their domestic market and ensure stable sources of future revenue.

University of Missouri Department of Parks, Recreation and Tourism. 2016. Media Advisory: Try Variety of Carp Dishes and Learn Why Eating Invasive Fish is Healthy for You and the Environment: Second Carp Festival. April 15.

A carp festival was held by the University of Missouri Department of Parks, Recreation, and Tourism to help promote the popularity of the fish. Local businesses, including Broadway Brewery, La Siesta Mexican cuisines, and Peking Chinese, offered a variety of carp dishes. The Conservation Federation of Missouri, MU Office of Sustainability and Missouri River Relief sponsored educational booths.

Varble, Sarah and Silvia Secchi. 2013. "Human Consumption as an invasive species management strategy. A preliminary assessment of the marketing potential of invasive Asian carp in the US." *Appetite*. Volume 65. Pages 58 through 67. <http://dx.doi.org/10.1016/j.appet.2013.01.022>

A national survey was conducted to gauge the attitudes of U.S. fish consumers toward the commercial use of Asian carp. The study included two variables; the willingness to try and the willingness to pay. Overall, the study indicated a willingness to try Asian carp if it were provided as a free sample and a willingness to pay for a variety of products to try the fish. For those willing to pay for the product, the major factor in purchasing was if the fish was caught and processed locally. Overall, the survey respondents did not possess an in-depth knowledge of the Asian carp problem in the rivers of the Midwest. This is promising for the U.S. market potential for Asian carp meat. Although hope exists for a U.S. Asian carp market, the future of an industry based on an invasive species, which is targeted for eradication, could be troublesome. Efforts must be made to deter local populations from incorporating into the local culture, which may lead to future cultivation and potential reintroduction. More research must be done to determine the potential for these future impacts; however, the survey provided a good overall preliminary assessment for entrepreneurs and organizations that may wish to develop the infrastructure for the market.

Webber, Tammy. 2016. "Huge, once-hated fish now seen as weapon against Asian carp." *AP News*. July 29. Online Address: <https://apnews.com/b3163712fc444ba789712a2872239e97/huge-once-hated-fish-now-seen-weapon-against-asian-carp>

The alligator gar is a large, predatory fish that has survived in southern states in tributaries of the Mississippi River and Gulf of Mexico. The fish is the second largest freshwater fish in the United States and was hunted to extinction in northern reaches due to a mistaken belief that they hurt sportfish. Allyse Ferrara, of Nicholls State University, stated that ecosystems are healthier with the gar because gar can keep harmful, invasive species, such as the Asian carp, under control. She related the treatment of the gar to the treatment of wolves in the US. The extent to which the gar will quell the carp populations is unknown, but it is believed that the carp populations can help sustain the gar populations and attract trophy hunters. The effort will face opposition from various populations deeming it a "trash" fish and from the large fish being hunted before reproductive age.

Wietecha, Ola. 2017. "Kentucky takes new measures to combat invasive Asian carp." *Undercurrent News*. March 2.

Kentucky and the Kentucky Department of Fish & Wildlife Resources (KDFWR) are encouraging fisherman to harvest Asian carp as a way to control their populations. Fin Gourmet, Two Rivers Fisheries, and Blue Shore Fishery are three small businesses processing Asian carp; however, it is become hard for fishers to meet the demand. A House Bill signed in April 2016, provided a new framework for public-private partnerships in Kentucky, which KDFWR hopes to use to ease the process of selling and buying carp. The KDFWR wants a private company to set up a warehouse and transportation system; the company would buy the fish from the fishers and then distribute to processors. This would alleviate the pressures of transportation from the fishers. Additionally, the KDFWR wants to encourage training of younger fishers, and showing them how to make a profitable, long-term career out of it. The KDFWR will not be using tax dollars to fund the project, but will use fees collected through sports fishing licenses.

Zhou, Mary. 2017. "Asian carp: From problem to profit." *China Daily*. March 17

In July 2013, Two Rivers Fisheries in Wickliffe, Kentucky, was opened by Angie Yu, who had previously developed a business in Iceland exporting lumpfish, discarded after row was removed for consumption, to China. The Asian carp market at the time was undeveloped; Yu had to develop a processing plant and mobilize the local fishers to start catching the carp. Since most local fishers were only part time and the

supply of carp was not sufficient, Yu set up her own full-time fishing team in 2017. Her main goal was to export the carp to China; however, most Chinese consumers prefer live fish to frozen, and commercial-raised carp is cheap in China. She is exploring opportunities to spread the market in the United States. The fishery has a culinary kitchen where Chinese employees, and even Chinese customers, would cook various carp dishes and invite local people to try them, which has increased the popularity of the fish in the area.

APPENDIX B

List of Interviewees and Interviews Summary

LIST OF INTERVIEWEES

Group	Bill Bolen (U.S. EPA) John Goss (Indiana Wildlife Federation) Kevin Irons (Illinois Department of Natural Resources)
Group	Ben Brockschmidt (Illinois Chamber of Commerce) Jim Foley (Bradley University)
Group	Dennis Riecke (Mississippi Department of Wildlife, Fisheries and Parks) Frank Fiss (Tennessee Wildlife Resources Agency)
Group	Joe McKeown (Illinois Department of Commerce and Economic Opportunity) Erik Brejila (Illinois Department of Commerce and Economic Opportunity)
Group	Keith Schneller (eBridgeAsia, LLC) Wang Jun (USDA, FAS, Beijing)
Group	Mark Morgan (University of Missouri) Silvia Secchi (Southern Illinois University)
Group	Rob Maher (Illinois Department of Natural Resources) (IDNR) Dan Stevenson (IDNR) Kevin Irons (IDNR) Chris Young (IDNR)
	Angela Ayers (Special Advisor on the Environment - State of Michigan)
	Angie Yu (Two Rivers Fisheries)
	Clint Carter (Carter's Fish Market)
	David Buchanon (Commercial Fisherman)
	Gene Kim, Ph.D. (USDA National Institute of Food and Agriculture)
	Gray Magee, Jr. (American Heartland Fish Products)
	Gregg Hochderffer (St. Andrew's Holy Carp! Fertilizer)
	Jason Goldberg (U.S. FWS)
	Jon Allan (State of Michigan Office of the Great Lakes)
	Kim Uhlig (Greater Peoria Economic Development Council)
	Michael Cody (Bare It All Pet Foods)
	Miguel Lugo (NOAA)
	Mike Schafer (Schafer Fisheries)
	Mike Weimer (U.S. FWS)
	Phil Caplis (Two25)
	Rachel Rock-Blake (Vanderbilt University)
	Ron Brooks (Kentucky Department of Fish and Wildlife Resources)
	Todd Turner (U.S. FWS)
	Yosef Chaim (Former President of Shafer Fisheries)



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
1	<ul style="list-style-type: none"> ▪ Lack of market demand ▪ Need to change the perception of Asian carp and/or get a better understanding of the positives of eating/using Asian carp ▪ Issues regarding the freshness of fish caught in Illinois and shipped around the world is not the best use of cargo space and there are issues with keeping it fresh 	<ul style="list-style-type: none"> ▪ Need to change the perception or get a better understanding of the benefits of eating/using Asian carp - they are not bottom-feeders ▪ Need to address the issues regarding the freshness of Asian carp caught in Illinois and exported out
2	<ul style="list-style-type: none"> ▪ Facilitate the export of products from Illinois and do a little facilitation on the import side ▪ Come across 3-4 potential projects (through the Trade Center) that had to do with exporting Asian carp to China; role is to help answer the trade issues associated with the potential export of carp ▪ Worked with helping with the financial projections for a company looking to do Asian carp processing ▪ Chief challenge - labor costs associated with getting commercial value from the fish ▪ Based on knowledge, if a U.S. brand is imported to China it is highly regarded 	<ul style="list-style-type: none"> ▪ Identify an entity with experience in exporting fish to China and indicate how it can be done ▪ Need Subject Matter Expert who is a large fish processor with experience in China
3	<ul style="list-style-type: none"> ▪ Marketing would be helpful - a successful marketing plan would be helpful to spur development 	<ul style="list-style-type: none"> ▪ Need additional processors and increased demand ▪ Need to have small plants and vessels to process millions of fish so need to look at similar industries for model



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
4	<ul style="list-style-type: none"> ▪ Processing facilities are essential - successful marketing plan would be helpful to spur development ▪ Challenges - Few fulltime commercial fishers, low price, gas, nets, ice, transportation. Not worthwhile when competing with catfish, gar, buffalo ▪ Need to understand carp populations to be able to give information to investors about populations available to inform about harvest. Harvesting carp is important to control. 	<ul style="list-style-type: none"> ▪ Need to follow Tilapia model. People in the world are eating carp, just not Americans
5	<ul style="list-style-type: none"> ▪ Receives inquiries regarding Asian carp business start-ups but most of the time the start-ups do not pursue the business ▪ The EDC is available to assist businesses in getting the right permits, put in touch with the right person or group, and resources ▪ When the EDC receives inquiries regarding Asian carp, they are not receiving the proper business plans ▪ Cost of human capital is the largest barrier (mostly labor costs) and the numbers do not work for businesses to make a profit 	<ul style="list-style-type: none"> ▪ Increase the cost of fish per pound so both the fishers and end user are making a profit ▪ Identify different options for fish production
6	<ul style="list-style-type: none"> ▪ Uses Asian carp as a protein source in pet food and treats ▪ Big issue - education - people do not know about Asian carp, the destruction they are doing, or how healthy they are ▪ Another issues - transportation - getting the fish from fishers and processors 	<ul style="list-style-type: none"> ▪ There is a need for manufacturing and/or processing plants along the river ▪ Educate the consumer about Asian carp



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
7	<ul style="list-style-type: none"> Exports to 16 countries; however, there are challenges is not being able to achieve the fish and the continuity of supply is not where it should be Lack of grant funding available to the private sector Fishers are not getting paid enough per fish to make a pro Different types of nets used to catch Asian carp - different nets could yield more fish Consider how to market / sell Asian car Fishers shouldn't have to haul the fish as well - having a tote of ice on their boat along with the weight of fish is difficult due to the low levels of the rivers, etc. 	<ul style="list-style-type: none"> Increase the number of commercial fishers; need additional buying stations along the Illinois and Mississippi Rivers Identify different ways to get the private industry interested in Asian carp Get Asian carp on the Title 3 humanitarian food aid Place buying stations where the fishers are - need to have a loading dock, large cooler and big ice machine
8	<ul style="list-style-type: none"> The U.S. FWS Midwest Region has been delegated to lead the Asian carp issues on behalf of the entire agency Works with different state agencies on running partnerships to develop priorities preventing Asian carp from moving into the Great Lakes in self-sustaining populations It is critical to remove Asian carp from the waterways - this is the most powerful thing in mitigating risk; need to include efforts to reduce the population and keep Asian carp out of the Great Lakes 	<ul style="list-style-type: none"> There is a need to increase the desirability of Asian carp - need to market the product Pitch Asian carp ideas as a strategic action that will have positive results Public outreach and awareness



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
9	<ul style="list-style-type: none"> ▪ The Department is receiving a lot of support from state government and cabinet which is key in making the Asian carp program successful ▪ There isn't a problem with the supply of fish and but how to get the fish to the processors ▪ Kentucky is doing so much work with Asian carp because their lakes are inundated with carp - \$1.2 billion/year industry ▪ Trying to save the Illinois River from carp - the amount of carp reduces the number of native species for recreational fishing - many fishing guides went out of business because of the Asian carp population 	<ul style="list-style-type: none"> ▪ Create a P3 partnership - fishers bring fish to a warehouse and the warehouse will distribute to different processors ▪ Tax relief for commercial fishers who catch Asian carp ▪ Get funding for some processors to expand their business - purchase different equipment to allow them to process more fish
10	<ul style="list-style-type: none"> ▪ Ships to 11 countries and sending full containers of processed fish to clients ▪ There is a local market as well and delivers fish to grocery stores and local markets ▪ She is not receiving enough fish to meet the needs of clients and running into issues with the quality of fish ▪ The types of equipment being used to catch Asian carp are impacting the quality of the fish once delivered to the processors ▪ Concern regarding what will the processors do if all the Asian carp are gone 	<ul style="list-style-type: none"> ▪ There is a need for more fishers and more processors - both need to cooperate in this industry ▪ Identify different ways to catch Asian carp which would improve the quality of the fish ▪ Develop new products and ways to use Asian carp ▪ Develop quality standards for Asian carp including transportation standards and assure delivery of fresh fish



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
11	<ul style="list-style-type: none"> ▪ The IDCEO is seeing domestic and foreign interests in project development for Asian carp ▪ Many of the DCEO projects provide benefits to businesses including Asian carp related enterprises 	<ul style="list-style-type: none"> ▪ Help investors think about doing business in Illinois - create 'certified' areas based on the number of fish, land, suppliers, workforce, etc. This will help the investor understand where they could place their business and help guide them in starting up the business ▪ Focus on workforce and site readiness
12	<ul style="list-style-type: none"> ▪ There needs to be 3 to 5 cooperative business groups that are capable of processing fish along the Ohio, Mississippi and Illinois Rivers ▪ There needs to be a solid business plan with one or two key products and expand the amount of fish caught, products produced, etc. - develop work force slowly ▪ Investment - everyone wants to solve the problem but the smaller scale ideas may be the more important ones to increase the broader scale ▪ Commercial and river fishing has declined in the U.S. ▪ Have seen not well thought out business plans, unrealistic expectations of the profit 	<ul style="list-style-type: none"> ▪ Identify a series of compatible and coordinated businesses that want to have steady need for fish and can pay the fishers on a regular basis ▪ Develop a good tasting product ▪ Look at domestic and foreign markets - it's used all over the world but not in the U.S. ▪ Need to have economic development people on board throughout the development of this project



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
13	<ul style="list-style-type: none"> ▪ The U.S. FWS does not have jurisdiction over the Illinois River because it is a state waterway ▪ U.S. FWS is the granting agency that provides funding to Illinois and their Asian carp programs ▪ The USGS is developing a deterrent and control research measures ▪ Currently, Asian carp are not a popular fish species for consumption in the U.S. because there is a stigma - big challenge that needs to be overcome ▪ U.S. FWS is cautious in promoting the commercial market because they want to eliminate invasive species populations and do not support long term goals of using invasive species ▪ Using Asian carp as a relatively inexpensive fish product in current seafood products; substitute in processed fish products 	<ul style="list-style-type: none"> ▪ In order to effectively impact the population of Asian carp, need to harvest at all life stages. If harvesting is the only option, need to identify ways to manage all life cycles ▪ Identify different products that can use the different life cycles of Asian carp ▪ Need to test the market for Asian carp ▪ Develop our Asian markets



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
14	<ul style="list-style-type: none"> ▪ Asian carp are identified as injurious wildlife and may not be imported or transported between States, DC, Puerto Rico or any U.S. territory - speak to Craig Martin (U.S. FWS) regarding this ▪ Harvesting and controlling the Asian carp population has been an issue U.S. FWS has been involved with ▪ Malheur National Wildlife Refuge paid a commercial fishers to harvest Asian carp in the refuge ▪ Many start-up businesses have been going to U.S. FWS for grants/funding. The businesses indicated that banks won't give them money due to their business plan which called for eradication of carp - U.S. FWS and NOAA cannot provide funds for start-ups ▪ USGS is developing a pesticide that targets just Asian carp 	<ul style="list-style-type: none"> ▪ Identify ways to make Asian carp a viable market ▪ Educate and outreach - if Asian carp is being served in restaurants, need to inform people that they are consuming the species to extinction and that it's short term (ex. lionfish in the Caribbean) ▪ Understand the biology of the species - what do the models say to maintain the lower level of fish and prevent them from moving north ▪ Figure out how you can establish a market that will reduce the number of fish and identify what happens when controlling a smaller population and cannot meet the needs of businesses - control vs. eradication



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
15	<ul style="list-style-type: none"> ▪ Some Chinese businesses had visited the US and wanted to purchase Asian carp for food services. Chinese like fresh fish and do not want frozen. In order to stay in business you need a huge amount of raw materials and since the fish are not farmed, you cannot guarantee supply. ▪ Fishers get paid about 15 cents per pound but they really need between 25 and 30 cents to cover their costs ▪ Reputation of the fish was damaged in China - a company was flash-freezing fish but not long enough and the fish were rotting before they arrived in China - gave the impression that the U.S. was shipping them their garbage ▪ The market for processed fish is not in China but perhaps in the Middle East ▪ Fishers don't have a lot of incentive to be involved in Asian carp. 	<ul style="list-style-type: none"> ▪ Find out if there is potential in canning Asian carp and sell to different ethnic communities ▪ Come up with an alternative name for Asian carp ▪ Market Asian carp as being fished from clean waterways in the U.S. - would be a big selling point ▪ Increase the price at which fishers are paid for per pound for Asian carp



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
16	<ul style="list-style-type: none"> ▪ The Aquaculture National Institute of Food and Agriculture funds universities for researching Asian carp as related to food and agriculture. Looks at producing new products with Asian carp, food quality, animal and fish feed, and aquaculture programs. ▪ Connect processors and businesses to funding programs and then linking researches looking at food products and types using Asian carp with the processors and end users ▪ Programs offered through this agency are for small businesses who want to do research; not for start-ups ▪ Agriculture and Food Research Initiative (AFRI) is a clearing house for multiple grants - for Asian carp, look at the food quality program priority ▪ Lack of info sharing between groups involved with Asian carp 	<ul style="list-style-type: none"> ▪ Create a toolkit that would answer questions regarding using Asian carp as food ▪ Have university cooperative extensions provide a course about Asian carp and provide information for interested in parties ▪ Look at potential markets to promote Asian carp and research all the potential uses to discover all of the opportunities for the final products for Asian carp.
17	<ul style="list-style-type: none"> ▪ Many US companies require certification for exporting seafood to EU, Middle East, south/central America, Asia, etc. ▪ US companies need to be in a NOAA seafood inspection program-certified facility for exporting to China ▪ There are 4 or 5 facilities across Mississippi River that harvest Asian carp, and ship frozen to China. The fish are further processed in China and consumed there for the most part. ▪ Minor challenges include the apparent seasonality of the carp fishery in the delta, and challenges facing small companies to certify fish for overseas export. ▪ Most important thing is getting the word out about Asian carp consumption - need to get people to start eating it 	<ul style="list-style-type: none"> ▪ Educate businesses on what the regulations are in a new company wants to enter the Asian carp market and export overseas. ▪ Incorporate carp into already known products but success depends on getting the right equipment in place, making sure consistency of fish would work for the specific product, etc. - develop a pilot program to develop fish products using Asian carp and test the market ▪ Marketing - inform people that it is an invasive species, show the environmental benefits of eating that fish



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
18	<ul style="list-style-type: none"> ▪ Highest value in using Asian carp is human consumption but can't use the whole fish because there is a lot of waste. An idea is to fillet out the meat and use whatever is left as fish meal ▪ Can get people to eat carp but the problem is that there isn't a stable statewide supply of carp. People start asking where to get it and they can't find it. ▪ Transportation issues - cannot get Asian carp delivered in a timely and cost-effective manner ▪ Concern about building businesses around carp yet some want to eliminate them completely 	<ul style="list-style-type: none"> ▪ Getting people to try Asian carp to realize it tastes good ▪ Find a sustainable way to use the carp that makes sense for both the environment and people beyond just the Great Lakes ▪ Promoting and marketing - provide carp as an alternative food source for people ▪ Look at the entire system; conduct a broader spectrum analysis
19	<ul style="list-style-type: none"> ▪ Peoria is a hot spot for Asian carp as there are a considerable amount of commercial fishers for a good starting fleet base ▪ Much information has been developed for education and safety, but no one is sharing information about how to catch the fish. Minimal amount of fishers who are experts in catching the fish; need more fishers if want the industry to grow. ▪ Working on a concept of developing a fishers's association - public-private partnership to provide protection for the fishers to fish waterways ▪ People have to see the value in Asian carp 	<ul style="list-style-type: none"> ▪ In order to create sustainable jobs, there needs to be a high value added product ▪ Travel abroad and establish relationships, exchange information, and trade goods ▪ Development of a Fishers's Association would be the number one incentive to spur fishing ▪ Programs for development of import/export tariffs at reduced rates would be helpful ▪ The federal government could provide an Asian carp farming subsidy to the fishers, similar to the farm subsidies offered to farmers today



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
20	<ul style="list-style-type: none"> ▪ Create a system in which companies feel comfortable using invasive species as resources to drive down the population ▪ Biggest issues is from the fishing side - difficult to monetarily motivate fishers to catch Asian carp for the prices being offered 	<ul style="list-style-type: none"> ▪ Coordinate rules amongst states with Asian carp; Coordination across states to allow flexibility to move across state lines to follow the resource ▪ Make it as easy as possible for fishers to enter this fishery ▪ Offer grant opportunities for starting small-businesses around Asian carp ▪ Develop a list of individuals for small businesses to talk with who are thinking of expanding into other states in regard to Asian carp
21	<ul style="list-style-type: none"> ▪ Sells to fish processors; working with the University of Illinois who purchase 400 pounds of fillet each week and using as meals for students ▪ The ultimate goal is removing fish from water and making money ▪ Difficult to get investors when the ultimate goal is reducing the population of fish ▪ Difficult to promote Asian carp because people think of Common carp ▪ Fishers are not getting enough for fish - 25 cents per pound would be ideal for now but getting it up to 50 cents per pound would be great ▪ Selling domestically would be the biggest profit ▪ A lot of the information out there regarding Asian carp is outdated or providing wrong information 	<ul style="list-style-type: none"> ▪ Marketing - majority of Americans do not know about the fish; need to market to the right people to develop different ways of using the fish and getting people to eat it ▪ Provide a tax break to fishers for catching Asian carp rather than subsidizing ▪ Need to talk to people who live and work with Asian carp everyday - get their thoughts and ideas



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
22	<ul style="list-style-type: none"> Michigan has a \$1 million prize to incentivize private development of market solutions for Asian carp If investments are made in carp-specific fishing/processing etc. and the efforts are successful at reducing or eliminating the carp then are we possibly setting these industries up for future failure? Need to be sure that they can pivot and remain economically viable. If the industry moves downstream, wouldn't fixed processing plants be a challenge? Perhaps mobile processing units? 	<ul style="list-style-type: none"> Collaboration between states and organizations to address the Asian carp threat and share resources Identify ways to increase the utilization of Asian carp; invest in research/development for other uses of the fish
23	<ul style="list-style-type: none"> There is not a market for Asian carp in the United States Fishers not receiving a high enough amount per pound of carp caught - equipment used for fishing carp is expensive and with the price per pound fishers are receiving, it is not covering the costs of equipment carp are not farm raised and it makes it difficult for fishers to predict the amount they will catch each day Asian carp are found in restricted areas where fishers cannot fish - these areas need to be open up for fishing of carp 	<ul style="list-style-type: none"> Make fish more available to fishers, processors and the end user - subsidize fish; market the fish Get Asian carp on the Title 2 food aid list; create some sort of protein powder to replace salmon (cheaper alternative) Get Asian carp in the domestic markets and market it properly - make it attractive to people; re-branding the fish



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
24	<ul style="list-style-type: none"> ▪ Department is working on preventing the spread of Asian carp into the Great Lakes ▪ IDNR has long term and short term goals to make sure Asian carp do not reach Lake Michigan - need to reduce the population in Illinois and ensure the carp do not affect the native fish population ▪ Reduce population of Asian carp throughout the State, not just prevent them from reaching the Great Lakes ▪ Limited workforce when it comes to fishing in the State - only a handful of licensed fishers fish full time for a living ▪ Logistics of getting fish to market is a big concern - need good quality fish to sell for human consumption - anything related to logistics needs attention 	<ul style="list-style-type: none"> ▪ Need new markets for Asian carp - mainly human consumption - to create a higher demand for the fish and help reduce the population ▪ Provide training to current and new fishers to get them started; provide some sort of incentive or assistance to startup a business ▪ Create contracts to hire people to start up a processing plant, provide transportation, and other tasks to get businesses up and running - have contractors do the job ▪ Need to identify a solid plan with goals, what needs to be achieved, how will fish be removed, etc. before putting together a program ▪ Develop a business model that would allow fish to be processed in different forms (human consumption, oils, protein, etc.) - use the entire fish
25	<ul style="list-style-type: none"> ▪ Developing a business that uses Asian carp that will also help reduce the overall number of carp in Midwest waterways - uses Asian carp as organic liquid fish fertilizer ▪ Transportation costs are high ▪ Chief challenges - business startup process, need a strong business plan, and finding the right people ▪ Only way to remove fish from the waterways is increase fishing and open fishing to the public ▪ Many fertilizer companies use petro/chemicals and not organic/fish based products for fertilizer 	<ul style="list-style-type: none"> ▪ Investments should be made in business startups that are using Asian carp - not building barriers that carp are getting past ▪ Application process to obtain loans and/or assistance to startup Asian carp-related businesses ▪ Create a media campaign that would get the word out on the high value of Asian carp ▪ Make Asian carp palatable for human consumption



ASIAN CARP INTERVIEWS SUMMARY		
Summer 2017		
	Key Points	Recommendations
26	<ul style="list-style-type: none"> Regulatory issues control the movement of the fish. The marketing and manufacturing side creates markets for the resource, and the fishers fish the resource, however they do not control the resource Mismanagement of Asian carp - trying to take hold of the population but not managing the resource Industry needs solid management team of experts with hands on experience to oversee the implementation of business development. 	<ul style="list-style-type: none"> If Illinois is targeting 20 to 50 million pounds of Asian carp each year, they need to add infrastructure and change the marketing program Build infrastructure where the fishing grounds are Marketing Use Asian carp for human consumption (fillers in food, etc.) For example, hake was successful and no longer being Need to have initiatives that reconstruct the industry - as fishers grow, production will grow; each processing plant must operate at 15M pounds per plant operating effectively and with innovative marketing.
27	<ul style="list-style-type: none"> Uses 100% of the fish and produces a dehydrated, high-protein fish meal and omega 3 fish oil Goal of building more processing plants along the rivers - the plants can render any animal but he chose to do Asian carp - only company taking Asian carp to make products worldwide Fishers need to be taken care of, and a subsidy would help A transportation contract would ensure the freshness of the fish. No matter how you process the fish, it needs to be fresh It is essential to consider local interests and company's need to make a profit. Be careful not to grow too big or will not be sustainable 	<ul style="list-style-type: none"> Need low interest loans for business startups - most people aren't willing to put in money Need to let commercial fishers use nets and fishing methods that enable them to catch the fish because they are not allowed through regulations. The commercial fishers are the key to the removal. To ensure fishers are engaged, provide a subsidy to the fishers or the processors to pass through from the state or federal government. IDNR should just come to the Beardstown plant and then replicate to get rid of fish and produce high value product



APPENDIX C

Interview Protocol

1. *Thank you for taking time* out of your day to speak with me.
2. Describe the *Asian Carp Analysis Project*.
 - Illinois Department of Natural Resources (IDNR), with US Environmental Protection Agency (EPA), has hired Tetra Tech
 - Conduct a *Business Process Analysis* to identify gaps and barriers that impede Asian carp-related business development
 - Develop an *Action Plan* aimed at spurring business activity that make use of these fish
 - The *ultimate goal of this effort is the fishing of Asian carp at a volume of 20 – 50 million pounds per year from Illinois waterways* resulting in considerable reduction in the population and prevention of spread
 - Starting with review of existing studies, data, resources, and business plans
 - Robust stakeholder information gathering process through a series of interviews involving:

Fishers	Members of Asian Carp Regional Coordinating Committee (ACRCC)
Fish Processors	State and local departments and agencies
End-Users	Federal departments and agencies
Universities	Advocacy group
Other States	
 - Your responses to this interview will be compiled with others, and presented without individual attribution
3. What *role do you play* in relation to Asian Carp control?
4. What *role would you like to play* in relation to Asian Carp control?
[Interviewer: probe their role and adjust conversation to tease out ideas.]
5. What are the *chief challenges you see preventing business development and greater fishing* of these fish?
6. What can be done to *address or solve these challenges*? Are there any *initiatives to support business start-up or expansion* you think will be helpful to spur greater fishing?
7. Are there any *initiatives to support business start-up or expansion* you think will be helpful to spur greater fishing?

FISH PROCESSORS ADDITIONAL QUESTIONS:

8. Kentucky is developing a *transportation contract to collect Asian carp from fishermen and deliver them to processors*. What impact would a transportation subsidy have on your business?
 9. Also, in Peoria, *investors are looking for a mix of carp products and processors that would work together to maximize higher profit, value added products* like protein and fish oil in cooperation with producers of fertilizer, fish meal and fish paste. What do you think about this business model?
 10. Another idea being discussed in Illinois is the *formation of a cooperative organization of fishermen to schedule and coordinate harvest and delivery to processors*. What impact would coordinated communication with fishermen have on your business?
11. If there is *one thing*, or *group of critical things to do to spur business development*, what would it look like?
 12. Can you suggest any *good sources of information on the Asian Carp market or related businesses*?
 13. May we reach back out to you if we have *follow-up questions*?

Thank you for your time



APPENDIX D

Financing and Technical Assistance Resources

FEDERAL FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
US Economic Development Administration	Financial Assistance	https://www.eda.gov/	The EDA provides multiple programs for economic development and planning to distressed communities around the US. Public Works programs provide communities with the resources to help revitalize and redevelopment their economies and local industries. These programs support construction, non-construction, and revolving loan fund investments. Economic adjustment programs (through the Revolving Loan Fund) provide small business owners and/or entrepreneurs with necessary gap financing to start or expand their business.	
US Small Business Administration	Financial Assistance/Technical Assistance	https://www.sba.gov/	The SBA provides support through four main functions: Business financing is provided in a variety of ways from micro lending to substantial debt and equity investment capital. Entrepreneurial development is provided in the form of free face-to-face or internet counseling and low cost training at 1,800 throughout the US and its territories. Federal procurement opportunities are provided through subcontracting procurement opportunities, outreach programs, and training. Lastly, the SBA functions as an advocate for small businesses, and testifies to their importance.	7(a) & 504 loan programs for commercial real estate; SBA will set guidelines for loans, from which its partners will supply the funding to small businesses

FEDERAL FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
SCORE Business Mentor	Technical Assistance	https://www.score.org/about-score	A nonprofit organization that provides educational and counseling opportunities to small business owners. Partnered with the Small Business Administration, SCORE is able to provide in person mentoring, free business tools, templates, and tips, and inexpensive or free workshops and webinars. Programs will help business owners to grow their businesses, identify target markets, maximize customer outreach, forecast sales revenues, and finance their business. Online tools and templates range from website building to determining financial projections.	
USDA Rural Development	Financial Assistance /Technical Assistance	https://www.rd.usda.gov/	The USDA partners with public/private community groups and financial organizations to provide several business programs to provide financial and technical assistance to stimulate rural business growth. The programs include, but are not limited to, funds for working capital, equipment purchasing, job training, and construction. The programs are also oriented to help improve the quality of life in rural areas through economic revitalization and self-sustainability. For more specific details on what the funds may be used for see the program descriptions at: https://www.rd.usda.gov/programs-services/all-programs/business-programs	Programs: - Business and Industry Loan Guarantees (B&I) - Intermediary Relending Program (IRP) - Rural Business Development Grants (RBDG) - Rural Business Investment Program (RBIP) - Rural Economic Development Loan and Grant (REDLG) - Rural Micro entrepreneur

FEDERAL FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
				Assistance Program (RMAP) - Value Added Producer Grants (VAPG)
New Market Tax Credit Program	Financial Assistance	https://www.cdfifund.gov/programs-training/Programs/new-markets-tax-credit/Pages/default.aspx	The Community Development Financial Institutions (CDFI) Fund allocates tax credit authority through the NMTC Program to Community Development Entities (CDEs), which are eligible to receive tax credit for equity investments made to businesses in economically distressed areas. Private lenders make investments to organizations that are certified CDEs, which will then provide loans and investments to businesses in these low-income areas. These funding opportunities allow for better rates and terms and more flexible features than other market loans. Ineligible funding activities include residential rental properties, golf courses, race tracks, gambling facilities, country clubs, certain farming businesses, massage parlors, hot tub facilities, suntan facilities, and liquor stores.	Development in economically disadvantaged communities; Loans can be used for the following, but are not limited to, working capital, construction, property/building purchasing.

FEDERAL FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
USDA North Central Regional Aquaculture Center	Technical Assistance	http://www.ncrac.org/	The NCRAC serves 12 states in the Midwest to provide technical assistance for aquaculture research, development, demonstration, and extension education that will enhance viable and profitable US aquaculture. Historically, the NCRAC has funded projects for emerging species that have good potential as food fish for production. According to the NCRAC, the region is characterized by diversity with over 50 different species being cultured and over 1,000 producers. The Regional Aquaculture Extension Program is the Center's education and outreach arm that helps to disseminate information to the public regarding all phases of aquaculture ventures and conducts training workshops for extension colleagues and industry members.	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

STATE FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Illinois Department of Commerce and Economic Opportunity (DCEO)	Financial Assistance	https://www.illinois.gov/dceo/Pages/default.aspx	DCEO is the department of Illinois state government that sponsors statewide economic development. Its mission is to provide economic opportunities for businesses, entrepreneurs, and residents that improve the quality of life for all Illinoisans, focused on transparency and accountability, enhancing customer service, increasing Illinois' competitiveness, advancing minority empowerment, modernizing Illinois' workforce, and elevating our state's promotional efforts.	

STATE FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Illinois Small Business Development Center	Financial Assistance/ Technical Assistance/ Real Estate Assistance	https://www.illinois.gov/dceo/SmallBizAssistance/BeginHere/Pages/SBDC.aspx	<p>The Illinois SMDC provides a variety of programs throughout the state to provide information, business guidance, training, and other resources to emerging and existing small businesses. These services include:</p> <ul style="list-style-type: none"> - One-on-one business advice and management assistance. - Assistance with the development of business plans. - Help with accessing market information and the development of marketing plans. - Assistance with accessing business financing programs. - Assistance with financial analysis and planning. - Access to business education and training opportunities. - Specialized services in technology, innovation and entrepreneurial development. 	<p>Additional resource: https://www.illinois.gov/dceo/SmallBizAssistance/BeginHere/Documents/ILSBDC_NewGroundCommRealEstate_Sept2013.pdf</p>

STATE FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Illinois SBDC: International Trade Center	International Trade Assistance	https://www.illinois.gov/dceo/SmallBizAssistance/BeginHere/Pages/default.aspx#tabitem1	<p>A subdivision of the Illinois SBDC, the ITC focuses on providing assistance with international trade and exporting to small businesses. The centers provide information, counseling services, and training to businesses looking to enter international markets. Services include:</p> <ul style="list-style-type: none"> - Evaluation of company's readiness to export - Access to foreign market information - Documentation assistance - Automated trade leads - Linkages with trade representatives 	

STATE FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Procurement Technical Assistance Center	Technical Assistance	https://www.illinois.gov/dceo/SmallBizAssistance/BeginHere/Pages/PTAC.aspx	<p>The PTAC provides small businesses the opportunity to gain information regarding selling goods and services to local, state, and/or federal government agencies. The centers provide counseling, technical information, marketing assistance, and training to existing businesses in the following areas:</p> <ul style="list-style-type: none"> - Help targeting appropriate government agencies - Automated bid lead matching services - Access to government specifications and standards - Guidance with quality assurance issues - Assistance with certifications - Identification of Sub-contracting opportunities - Bar Code and Packaging Information - RFID (Radio Frequency Identification) - UID (Unique Identification) - Contract Administration Information - System for Award Management (SAM) Assistance - Review of Bid Packages 	

STATE FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Small Business Environmental Assistance Program	Technical Assistance	https://www.illinois.gov/dceo/SmallBizAssistance/EnvironmentalAssistanceProgram/Pages/default.aspx	The SBEAP educates small businesses on the environmental obligations required by them to conduct business. The main mission of the program is to help small businesses meet the various regulations in order to support and protect the environment. The program provides free newsletter and educational outreach materials, permitting assistance, regulatory workshops and training, and other technical resources.	
First Stop Business Information Center	Technical Assistance	https://www.illinois.gov/dceo/SmallBizAssistance/Pages/LawsRegsAndPermitting.aspx	The First Stop Business Information Center provides individuals and businesses with comprehensive regulatory and permitting information. The Center runs the Regulatory Flexibility Program, which works with state agencies and business owners to determine how to make regulatory proposals more flexible, cost effective, or less restrictive. The Center will provide feedback from business owners to the state agencies regarding how the proposals may negatively impact the businesses.	

STATE FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Advantage Illinois	Financial Assistance	https://www.illinois.gov/dceo/SmallBizAssistance/AdvantageIllinois/Pages/default.aspx	<p>Advantage Illinois works with the state's banking community and venture capitalists to aid entrepreneurs and small businesses. AI has two programs to facilitate institutional lending to small businesses (Participation Loan Program and Capital Access Program). PLPs include:</p> <ul style="list-style-type: none"> - Standard Participation Loan Program: Enable small businesses to obtain medium to long-term financing as term loans with "below market" interest rates. - Minority/Women/Disabled/Veteran-Owned Businesses: Similar to Standard PLP, but for MWDV majority control/ownership businesses - Revolving Line of Credit: Similar to Standard PLP, but revolving line of credit with a maximum term of 2 years <p>Funding can be used for: start-up costs, working capital, business procurement, franchise fees, equipment, inventory, and purchase, construction, renovation, or tenant improvements of an eligible place of business that is not for passive real estate investment purposes</p> <p>CAP programs: Banks can provide term loans and revolving lines of credit to small businesses with <500 employees and at a maximum loan size of \$1 million. These loans are provided to businesses that cannot obtain funding under conventional lending policies and financed using small amounts of public resources. Funding can be used for most businesses except, construction or renovation/purchase of residential/rental housing.</p>	<p>Advantage Illinois Participating Institutions: https://www.illinois.gov/dceo/SmallBizAssistance/AdvantageIllinois/Documents/6-19-17%20AI%20Participating%20Fin%20Inst%20w-o%20CSP%20and%20w-o%20CAP.pdf</p> <p>Capital Access Program Fact Sheet: http://www.libertyville.com/DocumentCenter/View/12557</p>

STATE FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Illinois Finance Authority	Financial Assistance	http://www.il-fa.com/	The IFA is self-financed and issues taxable and tax-exempt bonds, loans, and investing capital for businesses, non-profit corporations, agriculture, and local government units. Financial assistance programs are available in a variety of sectors including agriculture and business/industry. The Participation Loan Program will help to finance the purchase of land or buildings, construction or renovation of buildings, and acquisition of machinery and equipment. For specific information regarding loan amounts, rates, etc. see the Participation Loan Program Summary. The Rural Development Loan Program will help to finance the purchase of land, construction or renovation of an industrial or commercial building, construction or improvement of infrastructure, or purchase of machinery and equipment. For specific information regarding loan amounts, rates, etc. see the Rural Development Loan Program Summary.	<p>Participation Loan Program Summary: http://www.il-fa.com/sites/default/files/business%26industry_participation_loan_program_summary.pdf</p> <p>Rural Development Loan Program: http://www.il-fa.com/sites/default/files/Rural%20Development%20Program%20Summary%2010_13.pdf</p>

STATE FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Illinois State Treasurers Office	Financial Assistance	http://illinoistreasurer.gov/	The State Treasurers Office provides programs to help start and expand businesses with affordable access to capital and financing to promote economic development. The Ag Invest program provides qualified farmers and agriculture professionals below market rate loans to purchase farm equipment, purchase of land, construction related expenses, or other costs related to conventional, sustainable, or value added agriculture production.	
Illinois Department of Commerce: Office of Trade and Investment	International Trade Assistance	https://www.illinois.gov/dceo/AboutDCEO/Pages/TradeInvestment.aspx	The Office of Trade and Investment's goal is to promote Illinois businesses worldwide by marketing to attract 'Foreign Direct Investment' and providing export assistance. The Office will work to connect business owners to global opportunities with the help of ten, well-established overseas offices. The Office also leads trade missions, curated overseas tradeshow, and outreach events and seminars. Information and support is provided to the SCDC ITCs to enhance outreach to small businesses owners.	
Illinois Sustainable Agriculture Research and Education Program	Financial Assistance	http://illinoissare.org/	Farm/land based education and research grant programs	



REGIONAL FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Greater Peoria - Economic Development Council	Financial Assistance/Technical Assistance/Workforce Training	http://greaterpeoriaedc.org/about/programs-and-services/	The GPEDC is a 501(c) 6 non-profit organization support by investment from businesses, organizations, counties, and cities through Logan, Mason, Peoria, Tazewell, and Woodford counties. The organization helps to facilitate interactions between businesses and communities to help spur economic growth. Services provided to local employers include facilitating meetings with other businesses, workforce development partners, and federal, state, and local leaders, assisting with foreign trade zone projects, connecting companies to critical financing and business incentive programs, supporting research and data needs, sharing building and site information, and helping with workforce planning. The organization has also tried to incentivize and promote the emerging Asian carp market.	<p>http://greaterpeoriaedc.org/asian-carp/</p> <p>Additional Programs - Elevate GP, Greater Peoria Manufacturing Network, GP Economic Gardening, Startup GP, GP Pathways, Live GP, Opportunity Greater Peoria, Peoria Pathways to Prosperity</p> <p>In addition to businesses, GPEDC will provide various services to communities to help economic development.</p>

REGIONAL FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Two Rivers Regional Council of Public Officials	Financial Assistance/Technical Assistance/Workforce Training	http://www.trrcopo.org/	The TRRC is an intergovernmental agreement between Adams, Brown, Pike, and Schulyer Counties in Illinois. The Council has an affiliated 501(c) 3, the Two Rivers Council Foundation and provides leadership and planning for units of local government to promote economic development. The Council works to provide workforce development for low-income adults, dislocated workers, and youth services with funding from the Trade Adjustment Assistance, Workforce Innovation and Opportunity Act-Illinois, and the Illinois DCEO. Public assistance is provided to local governments from several Federal, State, and Local agencies to help promote economic development in their jurisdiction, which can be used to help grow small businesses and economic opportunities. The Council also offers three Revolving Loans to businesses in the region: Economic Development Administration RLF - assists businesses relocating or expanding to the region that will have a direct impact on the area's economic recovery; Community Service Block Grant - helps fund business startups and the retention/expansion of existing businesses; USDA -RD grants.	

REGIONAL FINANCING AND TECHINCAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Madison County	Financial Assistance	http://www.co.madison.il.us/news_detail_T3_R61.php	In conjunction with Justine PETERSEN, a 501(c) 3 company and top micro-lender for the US SBA, Madison County introduced a micro-loan program for small businesses and entrepreneurs.	
Southern Five Regional Planning District	Financial Assistance/Technical Assistance	http://www.southernfive.org/services.html	The Southern Five services Alexander, Johnson, Massac, Pulaski, and Union Counties in Illinois to financing opportunities and technical assistance to small businesses. Revolving Loan funds are available through the Illinois DCEO and US EDA; Intermediary Relending Programs allow for the Southern Five to administer the IRP loans for the communities once received; the Rural Micro entrepreneurs Assistance Program is another loan program from the USDA-RD available to small businesses in the Southern Five. The Southern Five can provide local government technical planning assistance to help guide the startup, retention, and expansion of small businesses in the region.	

REGIONAL FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Greater Egypt Regional Planning and Development Commission	Financial Assistance/Technical Assistance	http://greateregyp.org/	Greater Egypt services Jackson, Jefferson, Perry, Williamson, and Franklin Counties in Illinois to provide economic development planning and assistance, technical assistance, and administer local, state, and Federal funding programs, including Economic Development Administration grants, Delta Regional Authority grants, Community Development Assistance Programs, and Enterprise Zone programs. Assistance is provided to the communities to help guide the startup, retention, and expansion of small businesses in the region.	Jackson County (Along Mississippi River); Jefferson, Perry, Williamson, Franklin Counties
Cass County	Financial Assistance	http://www.seecass.com/OECD.html	The Cass County Overall Economic Development Commission's mission is to retain, promote, and attract commercial and industrial development within Cass County. The Commission has Public-Private partnerships with: Public - Cities Villages, University of Illinois Extension, and Cass County; Private - First National Bank of Beardstown, West Central Bank, Petefish-Skiles & Company Bank, First National Bank of Arenzville, Beardstown Savings Bank, First National Bank of Barry, Virginia Branch, Cargill Meat Solutions, Inc., and Cass Communication. Funding is provided by contributions by public entities and private sector donations.	

REGIONAL FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Illinois Valley Area Chamber of Commerce and Economic Development	Technical Assistance/Workforce Training/Real Estate Assistance	http://www.ivaced.org/	IVAC services thousands of businesses in La Salle, Bureau, and Putnam Counties looking to relocate to the region or expand within it. Enterprise Zones and Tax Increment Financing districts offer both small businesses and large corporation incentives to develop in the region. Workforce training is provided through the Certified Production Technician Program, which provides students a certificate program to enter the production manufacturing industry. Additionally, the IVAC lists available commercial/industrial lots and buildings in the region that are for sale.	

REGIONAL FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Great River Economic Development Foundation	Financial Assistance/Technical Assistance/Workforce Training/Real Estate Assistance	http://www.gredf.org/	The GREDF services the City of Quincy and Adams County in Illinois to provide financial and technical assistance and workforce training to help retain existing businesses and alleviate the struggle of emerging new businesses. State funding resources available include: Community Development Block Grant, EDGE Tax Credit, Participation Loan Program, and Personal Property Tax Exemption; Local funding resources include: Rural Adams Development Corporation Loan Fund, Economic Development Loan Program, Enterprise Zone Program, Central Business District Revolving Loan Program, and Tax Increment Financing Program. The GREDF provides several workforce training opportunities, including Adams County Works, Inspire Works, the Quincy Promise, and the QU Trust, which provide education and resources for those entering the workforce, those seeking to maintain their careers, and those looking to enter another field. Available commercial/industrial properties are displayed on the GREDF website as well.	<p>Economic Development Guide: http://gredf.org/wp-content/uploads/2017/05/2107-Quincy-Adams-Co-Info-Sheets-7x8.5.pdf</p> <p>Incentive Overview: http://gredf.org/wp-content/uploads/2017/05/GREDF-Incentive-Overview.pdf</p>

LOCAL FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
City of Rockford	Financial Assistance/Technical Assistance	https://rockfordil.gov/	The Rockford Enterprise Zone and River Edge Zone provide financial and tax incentives to stimulate business growth in distressed areas. Additional financing options include tax increment financing and Community Development Block Grant funding. The Community and Economic Development Department also provides building, mechanical, and electrical inspections for existing and new construction. "BUSINESSFirst" is a program that assists in redeveloping existing properties or opening new businesses on existing properties	USEDA revolving grants; Rock River
City of Peoria	Financial Assistance/Real Estate Assistance	http://www.peoriagov.org/	The City provides financial incentives within its Enterprise and River Edge Redevelopment Zones. Additional financial assistance provided to businesses include: Tax increment financing to finance public infrastructure, land acquisition, and certain private development costs; Revolving Loan Fund provides gap financing to businesses for multiple purposes ranging from real estate to working capital loans. The City also lists available commercial/industrial properties on its website.	USEDA revolving grants; Illinois River

LOCAL FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
City of Beardstown	Financial Assistance	http://www.cityofbeardstown.org/index.aspx?nid=1020	The City provides financing from its Revolving Loan Funds program to businesses at interest rates at or below the market rate. Tax increment financing and Enterprise Zones provide tax and regulatory incentives to businesses developing within these zones.	USEDA revolving grants; Rock River
City of East Peoria	Financial Assistance/Real Estate Assistance	http://www.cityofeastpeoria.com/governmentdepartments/planning-development/economic-development/	The City set up a Revolving Loan Fund to assist existing and new businesses with gap financing for projects within the City that will create/retain jobs, diversify the economy, and expand the tax base. The City requires applicants to have a lead lender that will assist them with the application. Funds can be used to real estate acquisition, as well as equipment and machinery purchasing, which must be noted in the application. Additionally, Tax increment financing districts and Enterprise zones provide a variety of incentives for establishing businesses. Available commercial/industrial sites and buildings in the City are provided on the City's website.	Revolving Loan Fund: http://www.cityofeastpeoria.com/data/files/PlanningDept/Revolving%20Loan%20Fund.pdf Illinois River
City of Havana	Financial Assistance	http://www.scenichavana.com/economic-development.html	The City manages two Revolving Loan Funds that provide qualified area businesses low-interest loans. Tax Increment Financing zones are also available to provide incentives for establishing businesses to revitalize distressed areas.	Illinois River

NON-PROFIT & UNIVERSITY FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Illinois-Indiana Sea Grant - Asian Carp	Technical Assistance	http://www.iisgcp.org/ais/asiancarp.php	The IISG is a collaboration between the University of Illinois and Purdue University that is a part of the NOAA's National Sea Grant Program. The mission of the IISG is to use research, education, and outreach to secure a healthy environment and economy for the Lake Michigan region. They provide expertise on the following topics: aquaculture, aquatic invasive species, climate change, nutrients, Great Lakes ecosystems, and water resources. The IISG has a program dedicated to the Asian carp, and in 2010 held a conference to determine the marketing potential of Asian carp.	Additional: http://www.iisgcp.org/catalog/ais/asian_carp_summit.php
Purdue University	Technical Assistance	https://ag.purdue.edu/agecon/Pages/Aquabusiness-Business-Development.aspx	Purdue University - Agriculture Economics Department provides several resources for individuals looking to start an aquaculture business. Resources provide information regarding how to set up your business and how to finance it as well. The University also provides a business plan template and business planning guide to help support emerging businesses establish a solid foundation from which to grow and expand.	Aquaculture business technical resources

NON-PROFIT & UNIVERSITY FINANCING AND TECHINCAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
Southern Illinois University	Technical Assistance	http://fisheries.siu.edu/	The Center for Fisheries, Aquaculture, and Aquatic Sciences at SIU located in Carbondale, IL has several research facilities including the Aquatic Research Laboratory and Saluki Aquarium in Carbondale and the SIU Fish Research Facility along the Mississippi River in Cordova, IL. The Center conducts research and is a great resource of knowledge in several fields including, fish ecology, fisheries management and stock assessment, ecosystem modeling, and fish health/nutrition.	

NON-PROFIT & UNIVERSITY FINANCING AND TECHNICAL RESOURCES				
Organization	Type of Service	Website	Description	Notes
RiverBend Growth Association	Financial Assistance/ Technical Assistance/ Workforce Training	http://www.growthassociation.com/	The RiverBend Growth Association serves at the Chamber of Commerce and the Economic Development Organization for Alton, Bethalto, East Alton, Elsau, Foster Township, Godfrey, Grafton, Hartford, Roxana, South Roxana, Wood River, and Wood River Township. The Association is able to tailor education and training to fit specific occupations as needed and collaborate with multiple colleges, institutes, and state/county training programs. Private and public financing options are available. With the help of the RGA, Illinois DCEO, and Madison County Community Development private sources can provide low-interest loans and/or loan guarantees at fixed rates and other tax incentives. Public assistance options include the Madison County Community Development Block Grant, which can be used to purchase land, buildings, equipment, and the construction/renovation of facilities, Illinois Enterprise Zone program, which cannot be used for debt refinancing and contingency funding, and Tax Increment Financing, which can be used for land acquisition, site clearance, building rehabilitation, and the construction of public infrastructure.	Southwestern Illinois

FOLLOW-UP OPPORTUNITIES				
Organization	Type of Service	Website	Description	Notes
Big River Fish	Processing Plant	http://www.bigriverfish.com/about.html	Big River Fish is a processing plant located in Griggsville, IL. The processing plant is the largest producer of wild caught Asian carp in the US. The plant is certified by multiple domestic and international organizations, including the FDA, the Illinois Commercial Fishing Association, the European Food Safety Authority, and the Certification and Accreditation Administration of the People's Republic of China.	
Phelps Industries, LLC	Pet Food Manufacturing	http://phelpsindustriesllc.com/	Phelps Industries has two production facilities located in Rockford, IL, with a Warehouse facility located in Caledonia, IL. They specialize in producing pet snacks and treats for dogs and cats using a variety of meats, including salmon, whitefish, and tuna. Like Evanger's, they have the capability to produce fish based products. They also have the following certifications: SQF Level 2 Certification, USDA Organic Certification, and APHIS Certificates for Canada and the EU.	Potential outreach for incorporating carp
Various factories	Meat Processing	http://meat-processing.regionaldirectory.us/illinois.htm	This website provides a directory of a multiple meat processing businesses in Illinois. The primary meat production for these businesses is beef, but the use of Asian carp could be marketed to them. Several of the businesses are located in Peoria County (Illinois River), Rock Island County (Mississippi River), and Monroe County (Mississippi River).	Potential outreach for incorporating carp

FOLLOW-UP OPPORTUNITIES				
Organization	Type of Service	Website	Description	Notes
Fortune Fish Co.	Fish Processing	http://www.fortunefishco.net/	Fortune has two facilities located in Bensenville, IL and Minneapolis, MN. The company both processes and ships fresh fish by truck to Illinois, Indiana, Missouri, Iowa, Minnesota, Wisconsin, and Michigan and by air to the remainder of the continental US. Additionally, the company provides classes to customers, culinary schools, and other education organizations associated with the hospitality industry; classes include, Seafood purchasing, Fishing and farming methods, Sustainability, and Underutilized species. If Asian carp could be incorporated into production, courses promoting the use and consumption of the fish could also be possible.	Potential outreach for incorporating carp
Dixon Fisheries, Inc.	Fish Processing	https://www.dixonsseafood.com/about-us	Dixon specializes in the processing and wholesale of fresh fish in the Midwest. The company has two stores located in East Peoria and Peoria, IL. The Greater Peoria EDC lists Dixon as one of the 'Key Leaders & Participants' in its Asian carp program.	

APPENDIX E

List of Asian Carp Processors and Products

ASIAN CARP PROCESSORS AND PRODUCTS				
Name	Address	Contact	Products	Website
Iowa				
Stoller Fisheries	PO Box B 1301 18 th Street Spirit Lake, IA 51360	Larry Stoller 800-831-5174; 721-336-1750 stollerfisheries@mchsi.com	Plate-frozen fish blocks; soup bases and fish stocks; fish roe; caviar; carp pituitary glands; custom processing	http://sfishinc.com
Illinois				
Bare It All Pet Foods	2010 West Fulton Street Suite F254 Chicago, IL 60612	Mike Cody 612-265-0367 mike@bareitallpetfoods.com	Pet treats for dogs and cats	https://www.bareitallpetfoods.com
Big River Fish	30402 State Hwy 107 Griggsville, IL 62340	Rick Smith 217-833-2260 ---	Fresh fish; dried fish; fish maw	www.bigriverfish.com
Carter's Fish Market	1900 South Grand Avenue E Springfield, IL 62703	Clint Carter 217-525-2571 Carterfish83@gmail.com	Seafood restaurant	---
Dixon Fisheries, Inc.	1807 N. Main Street East Peoria, IL, 61611	--- 800-373-1457 internetsales@dixonsseafood.com	Fresh fish; frozen fish; value-added products;	https://www.dixonsseafood.com/
Evanger's – Food for Dogs and Cats	221 S Wheeling Road Wheeling, IL 60090	Holly and Joel Sher 847-537-0102 sales@evangersdogfood.com	Pet food for dogs, cats, and ferrets. Some products are salmon based	https://evangersdogfood.com/
Fortune Fish Co.	1068 Thorndale Avenue Bensenville, IL 60106	--- 630-860-7100 info@fortunefishco.net	Fresh fish; fish-based products; seafood purchasing courses, fishing/ farming methods, sustainability, and underutilized species	http://www.fortunefishco.net/

ASIAN CARP PROCESSORS AND PRODUCTS				
Name	Address	Contact	Products	Website
Phelps Industries, LLC	5213 26 th Avenue Rockford, IL 61109 5107 26 th Avenue Rockford, IL 61109	Amy Besco 815-397-0236 customerservice@phelpsindustriesllc.com	Pet snacks and treats for dogs and cats; Utilize multiple fish species – salmon, whitefish, and tuna.	http://phelpsindustriesllc.com/
Schafer Fisheries	PO Box 399 Tomson, IL 61285	Mike Schafer 844-591-6655 fish@schaferfish.com	Fresh fish; frozen fish; fish-based fertilizer; smoked fish	www.schaferfish.com
Various Factories	Check facility information in directory.	Check facility information in directory.	Variety of meat processors and products in Illinois	http://meat-processing.regionaldirectory.us/illinois.htm
Kentucky				
Blue Shore Fishery	11525 State Rt 97 Farmington, KY 42040	Andre Raghu 917-386-7745 andre@blueshoreusa.com	Fresh fish; value-added products	www.blueshoreusa.com
Two Rivers Fisheries	1148 Wickliffe Road Wickliffe, KY 42087	Angie Yu 270-681-4099 angie@tworiversfisheries.com	Fresh fish; fish ribs; fish patties; fish dumplings; sausages	http://www.tworiversfisheries.com/
Minnesota				
Fortune Fish Co.	2330 Minnehaha Avenue South Minneapolis, MN 55404	--- 612-724-5911 sales@coastalseafoods.com	Fresh fish; fish-based products; seafood purchasing courses, fishing/farming methods, sustainability, and underutilized species	http://www.fortunefishco.net/
Missouri				
Heartland Harvest Naturals, LLC	Blue Spring, MO	Mike Cherner 816-835-3274 ---	Fish-based fertilizer	http://heartlandharvestnaturals.com

ASIAN CARP PROCESSORS AND PRODUCTS				
Name	Address	Contact	Products	Website
South Dakota				
St. Andrew's Holy Carp Fertilizer	Sioux Falls, SD	Greg Hochderffer 712-635-1966 holycarpinfo@gmail.com	Fish-based Fertilizer	http://www.holycarpfertilizer.com/
Wisconsin				
Kencor Ethnic Foods, Inc	6332 31 st Ave Kenosha, WI 53142	Morgan Enowmbitang 262-764-4162 morgan.enowmbitang@kencorfoods.com	Livestock feed; Dried fish powder; Dried fish; Pet foods and treats; Custom products	www.kencorfoods.com

