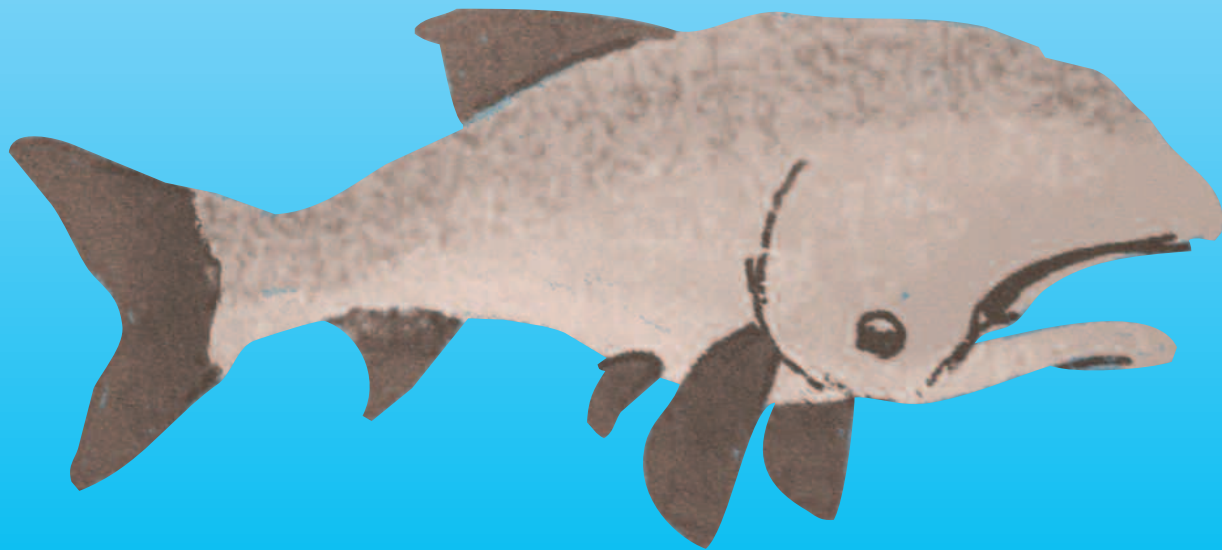


TIPPING THE SCALES



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HOW CANADA AND ONTARIO CAN
PREVENT AN **ASIAN CARP INVASION**
OF THE GREAT LAKES July 2013

TIPPING THE SCALES: How Canada and Ontario can prevent an Asian carp invasion of the Great Lakes

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ENVIRONMENTAL DEFENCE is Canada's most effective environmental action organization. We challenge, and inspire change in government, business and people to ensure a greener, healthier and prosperous life for all.

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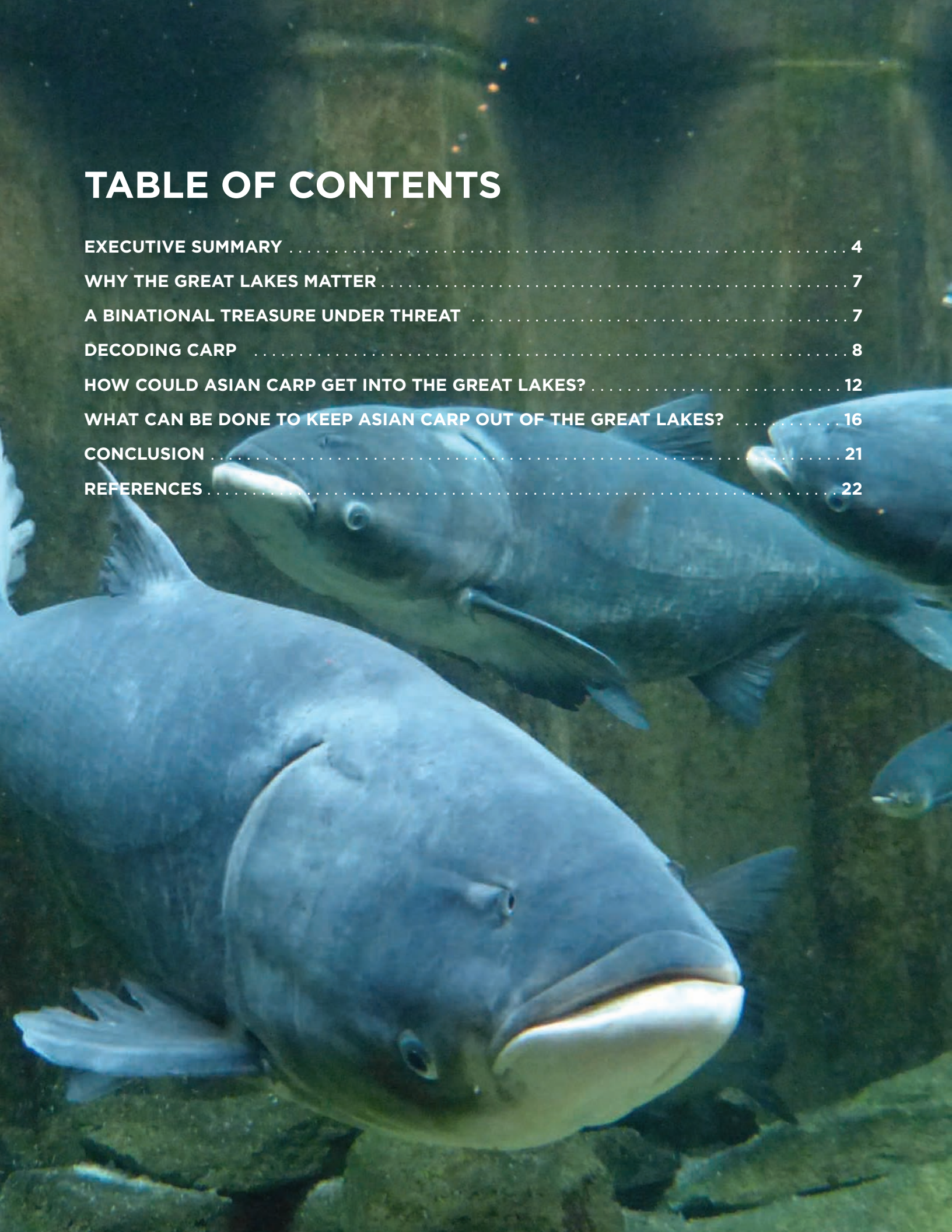


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EXECUTIVE SUMMARY



The Great Lakes are integral to the strength and success of Ontario and the eight states that border them. The lakes are the largest source of available freshwater to more than 40 million people, as well as countless birds, animals, and fish. Much of the region's recreation, tourism, and manufacturing industries are dependent on the Great Lakes, which also support a productive commercial and sport fishery, and a diverse ecosystem.¹ People who live within the basin feel connected to the lakes, whether they've played volleyball on the beautiful beaches, spent sunny afternoons boating on open waters, or fished off of the docks with their families.

Yet, the Great Lakes face a very serious and imminent threat with the invasive Asian carp on their doorstep. Two of the most dangerous types of carp, the bighead and silver carp, have been advancing northward from the Mississippi River basin since the early 1990s.² If Asian carp move into the Great Lakes, they will cause irreversible harm by consuming large quantities of food, out-competing native fish populations, and altering native habitats.³

The risk to the region's environmental, economic, and recreational sectors would be significant and potentially severe in the case of an invasion.⁴ If Asian carp enter Lake Michigan, it is predicted that they will spread to Lake Huron and Georgian Bay within five years and into Lake Erie within 20 years.⁵ Asian carp could disrupt the natural balance of the ecosystem, wreak havoc on the \$7 billion US⁶ recreational and commercial fishing industry, and threaten the \$16 billion US⁷ boating industry. In the parts of the U.S. where Asian carp have already invaded, they quickly became the most prevalent species of fish, making up 95 per cent of the biomass in some Illinois rivers.⁸

Asian carp are strange invaders. They can grow to over a metre long, rapidly growing too large for native predators.⁹ When startled, silver carp can jump more than one metre out of the water and have injured some boaters in the U.S. Like zombies, they can appear dead when they're not, surviving out of water for up to 48 hours.¹⁰ They also breed like mad and only need 10 male and 10 female carps to establish a new breeding population.¹¹ One of the reasons why they are so destructive to the ecosystem is because they can eat up to 20 per cent of their body weight each day, consuming enormous amounts of food that other fish need to survive.¹²

If Asian carp gain access to the Great Lakes system, there is little that could be done to control them. In fact, federal government sources warn that "if no additional management actions around the entire basin are taken," the arrival of Asian carp is "impending," and that their survival would be "immediate upon arrival."¹³ Currently, a system of electric barriers serve as a key line of defence against an Asian carp invasion to the Great Lakes, but the system is vulnerable and therefore inadequate as a long-term solution.¹⁴ Other potential pathways of entry include poor management of bait fish (which could include small Asian carp), illegal possession, and importation for fish markets.¹⁵

It will be an uphill battle to keep Asian carp out of the lakes, but it is possible if governments and stakeholders in Canada and the U.S. work together to block all of the ways Asian carp can access

If Asian carp move into the Great Lakes, they would cause irreversible harm by consuming large quantities of food, out-competing native fish populations, and altering native habitats.

the Great Lakes through a combination of infrastructure solutions, border control, public engagement, and outreach. Industry, non-government organizations, First Nations, and the general public need to be involved through the development of best management practices for invasive species control. In particular, the most effective and permanent solution is to restore the ecological divide between the Great Lakes and Mississippi River basins to prevent all invasive species, including Asian carp, from moving between the two watersheds. To that effect, the governments of Ontario and Canada can encourage U.S. decision-makers to move quickly towards permanent separation.

To protect the health of the Great Lakes and connected rivers, Ontario residents should learn how to identify Asian carp so they can report any sightings to the Invasive Species Hotline to facilitate immediate response by government officials. They should avoid buying Asian carp for food or bait, and write political leaders to ask them to pressure the U.S. to take the actions required to block canals and other aquatic pathways between the infested Mississippi River basin and the Great Lakes.



PHOTO: Jason Lindsey

SUMMARY OF RECOMMENDATIONS

What can the governments of Canada and Ontario do?

- * Support a permanent barrier on the Chicago Area Waterway System to keep Asian carp out of the Great Lakes
- * The federal government should prohibit the import of live Asian carp, and any future aquatic invasive species, into Canada
- * Improve border enforcement coordination and education
- * Set regulations that require evisceration of carp before crossing into Canada from the U.S.
- * Improve outreach and communications with anglers and baitfish sellers
- * Prioritize keeping the Great Lakes Asian carp-free in the Canada-Ontario Agreement (an implementation tool of the Great Lakes Water Quality Agreement)
- * Involve industry, non-government organizations, First Nations, and the general public in the development of best management practices for invasive species control

What can individuals do?

- * Learn how to identify Asian carp and report any sightings to Ontario's Invasive Species Hotline at **1-800-563-7711** or online at **invadingspecies.com**
- * Don't buy, sell, or transport live Asian carp for food
- * Be an educated and responsible angler and bait harvester
- * Learn more by watching ENVIRONMENTAL DEFENCE'S Asian carp video at **environmentaldefence.ca/asiancarp**

WHY THE GREAT LAKES MATTER

The Great Lakes are truly magnificent. As the world's largest source of available freshwater, the lakes belong to over 40 million people¹⁶—as well as countless birds, animals, and fish—who call the basin their home. They provide us with a high quality of life, clean drinking water, food and electricity. They moderate the climate, can have a calming effect on our emotions, and inspire imagination and creativity.¹⁷

The Great Lakes are important to the environment, economy and local communities. The region supports one of the most diverse ecosystems in North America. Some of the plants and animals that live here exist nowhere else in the world. Together with the St. Lawrence River, the region is the heart of the continent's economy, supporting 56 million jobs and a GDP of \$5.1 trillion US.¹⁸ The Great Lakes support a popular sport fishery and Lake Erie is one of the most valuable freshwater commercial fisheries in the world.¹⁹ Great Lakes' communities enjoy a strong recreation and tourism industry. In fact, people from all over the world are drawn to the area's beaches, marinas and waterfronts.²⁰

A BINATIONAL TREASURE UNDER THREAT

At the same time, there is a very imminent and serious threat knocking at the Great Lakes' door. Fast-growing and aggressive Asian carp are on the verge of invading the ecosystem from the Mississippi River basin.²¹

The health of the Great Lakes ecosystem hangs on the ability of a series of electric fences in the Chicago Area Waterway System to deter Asian carp and other invasive fish from accessing Lake Michigan and subsequently other Great Lakes.²² A brief failure could allow Asian carp to escape into the Great Lakes, and eventually to inland rivers and lakes, causing significant economic, environmental and social consequences.²³




THE IMPENDING THREAT

When it comes to Asian carp, only 10 females and 10 males are needed to establish a new population capable of reproducing.²⁴ The Great Lakes offer plenty of suitable breeding habitats. Lake Huron, Lake Ontario, and Lake Erie are particularly vulnerable because they have tributaries that have the right combinations of temperature, flow speed and length of passable water to serve as an Asian carp nurseries.²⁵ Fisheries and Oceans Canada considers the risk of establishment and magnitude of impacts of Asian Carp extremely "high" in the Great Lakes.²⁶

If Asian carp enter Lake Michigan, the Canadian government predicts that they would spread to Lake Huron and Georgian Bay within five years and into Lake Erie within 20 years.²⁷ Once they are in the Great Lakes system, there is little that can be done to control them. In fact, federal government sources warn that "if no additional management actions around the entire basin are taken," the arrival of Asian carp is "impending," and that their survival will be "immediate upon arrival."²⁸

DECODING CARP

The broad term “Asian carp” refers to many different species of fish native to Asia, including the bighead, black, silver, grass and common carp as well as the common goldfish.²⁹ However, in this report we are using the term to refer to the bighead and silver carp, the species that have aggressively invaded U.S. waters and would have the most devastating impact on the Great Lakes. Below are some of the invasive carp already established, or threatening to establish, in the Great Lakes.



SPECIES	SIZE ³⁰	RANGE ³¹	PRIMARY CONCERNS ³²
<p>BIGHEAD CARP</p> 	<ul style="list-style-type: none"> • Up to 45 kg • 1.4 m long 	<p>There is evidence of reproducing populations throughout the Mississippi River basin.</p>	<p>They have potential to deplete food sources for native fish and mussels.</p>
<p>BLACK CARP</p> 	<ul style="list-style-type: none"> • Up to 70 kg • 1.5 m long 	<p>The species has likely established in parts of the Mississippi River basin.</p>	<p>They would negatively impact native aquatic communities by feeding on, and reducing, populations of native mussels and snails.</p>
<p>SILVER CARP</p> 	<ul style="list-style-type: none"> • Up to 27 kg • 1 m long 	<p>There is evidence of reproducing populations throughout the Mississippi River basin.</p>	<p>They have potential to cause enormous damage to native species by feeding on plankton required by larval fish and native mussels. The fish also leap in the air, and pose a threat of injury to boaters.</p>

SPECIES

SIZE³⁰

RANGE³¹

PRIMARY CONCERNS³²

SPECIES	SIZE ³⁰	RANGE ³¹	PRIMARY CONCERNS ³²
<p>GRASS CARP</p> 	<ul style="list-style-type: none"> • Up to 36 kg • 1.25 m long 	<p>There are established populations in the Mississippi River basin. A few have been found in the Great Lakes basin, but breeding populations have not yet established in Canadian waters.</p>	<p>They compete for food with invertebrates and other fish. They can interfere with the reproduction of other fish.</p>
<p>COMMON CARP</p> 	<ul style="list-style-type: none"> • Up to 40 kg • 120 cm long 	<p>They have been established in the Great Lakes basin for over 100 years.</p>	<p>They tend to deteriorate quality of native fish habitat.</p>

CARP ILLUSTRATION CREDITS:
 Bighead Carp: Joe Tomelleri
 Black Carp: Joe Tomelleri
 Silver Carp: Joe Tomelleri
 Grass Carp: Joe Tomelleri
 Common Carp: New York State Department of Environmental Conservation

If Asian carp enter Lake Michigan, it is predicted that they would spread to Lake Huron and Georgian Bay within five years and into Lake Erie within 20 years.

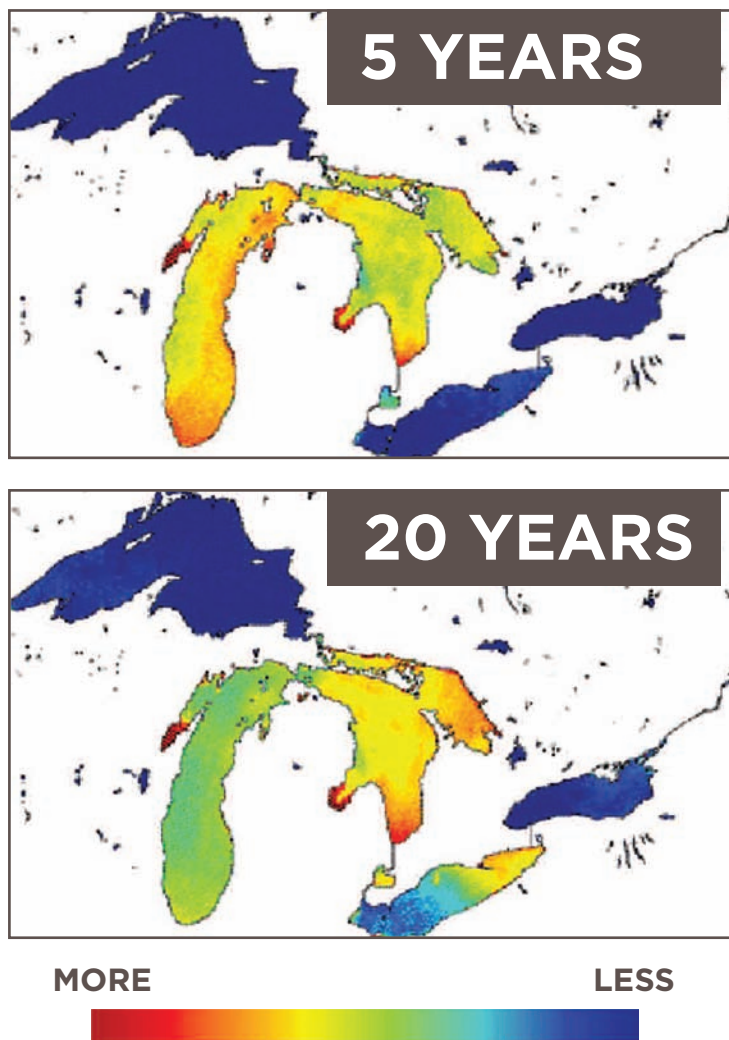


ENDANGERING THE GREAT LAKES ECOSYSTEM

Asian carp will cause irreversible harm to the Great Lakes by consuming large quantities of food, out-competing native fish populations, and altering native habitat.³³

Depending on the type, an Asian carp can eat up to 20 per cent of its body weight every day, consuming enormous amounts of food that other fish need to survive.³⁴ Researchers predict that young native fish species that are important food and game fish in the Great Lakes—including lake whitefish, walleye, and yellow perch—would find it hard to compete with Asian carp for their primary source of food.³⁵ This could lead to steep declines in populations of native species and reduced fish diversity in the Great Lakes.³⁶

Predicted Spread After Introduction to Lake Michigan:



SOURCE: Fisheries and Oceans Canada

In addition to being food-hogs, by the end of their first year Asian carp will outgrow any predators in the lakes. As a result, the natural mechanisms for species control wouldn't be available.³⁷

Further, these fish are able to reproduce rapidly, quickly dominating any water body they live in. Once sexually mature (usually within two to three years)³⁸, the fish will spawn several times a year.³⁹ One female Asian carp can produce as many as one million eggs in her lifetime.⁴⁰ In some parts of the Illinois River, Asian carp now make up more than 95 per cent of the biomass.⁴¹

ECONOMIC IMPACTS

Such massive changes to the ecosystem could spell big trouble for the regional economy. Industries that tend to be most acutely affected by aquatic invasive species include sport and commercial fishing, water treatment, power generation, industrial facilities using surface water, and tourism. Together, these industries employ over 125,000 workers in the Great Lakes region.⁴²

In particular, the impacts of an Asian carp invasion will be felt by the recreational and commercial fishing and fishery-based activities in the Great Lakes region, which is valued at \$7 billion US annually.⁴³

Ontario's economic stake is substantial. In 2011, the commercial Great Lakes fishing industry contributed \$234 million⁴⁴ to Ontario's economy. Each year in Ontario, recreational anglers spend \$600 million on food, lodging, travel, and equipment in the Great Lakes region.⁴⁵

Much of this economic activity could be at risk in the event of an Asian carp invasion. The foundation of any fishing economy is the enjoyment people get from catching a delicious, beautiful fish. The presence of Asian carp would mean fewer prized sport and commercial fish species, triggering a significant drop in angling activity.⁴⁶

RECREATIONAL IMPACTS

It's not just the fishing economy that would be affected by an Asian carp invasion. Communities and businesses depending on Great Lakes recreation could be hurt financially, too. Ontario's tourism industry relies on the Great Lakes as a wonderful place for swimming, canoeing, and boating—all of which could be negatively affected by Asian carp.⁴⁷

The binational boating industry, valued at \$16 billion US annually, is specifically at risk.⁴⁸ The notorious silver carp, at a weight of up to 27 kg, can jump over a metre out of the water when startled by incoming watercraft.⁴⁹ Their extreme size coupled with their jumping ability is a serious danger to recreational boaters and anglers. In the U.S., the jumping fish have injured boaters and knocked people off of their jet skis,⁵⁰ and even kayakers have reported being hit by flying carp.⁵¹ Anyone who uses a boat risks being struck by the excitable silver carp. Such hazards could scare away recreational boaters in the Great Lakes.⁵²

ASIAN CARP BY THE NUMBERS



- * **\$234 million** - 2011 value of commercial and recreational fishing industry in Ontario⁵³
- * **1.5 million** - number of anglers fishing the Great Lakes per year⁵⁴
- * **\$600 million** - amount anglers spend on equipment, food, and lodging each year in Ontario⁵⁵
- * **80** - number of Canadian markets, companies, and restaurants that distribute Asian carp (primarily in the Toronto area)⁵⁶
- * **\$12.3 billion US** - estimated spending of the over 73 million tourists who visited the Great Lakes region in 2010⁵⁷
- * **125,000** - number of workers in Great Lakes region relying on jobs most vulnerable to impacts of aquatic invasive species⁵⁸

HOW COULD ASIAN CARP GET INTO THE GREAT LAKES?



THE CHICAGO AREA WATERWAY SYSTEM

Beginning in the 1970s, Asian carp were intentionally imported into the U.S. by government agencies and fish farmers to reduce algae in waterways and aquaculture ponds. During floods, the fish escaped into the Mississippi River basin. Over the past few decades, the Asian carp population has exploded. Now, silver and bighead carp infest waters of at least 18 U.S. states.⁵⁹

Since then, the fish have spread northward toward the Chicago Area Waterway System, the artificial doorway to the Great Lakes by way of Lake Michigan. This network of artificial waterways, canals, and locks in Chicago and northwest Indiana creates a manmade link between the Mississippi River basin and the Great Lakes. Underwater electric fences were built in 2002 and 2006 to prevent fish



from passing through these waterways. The fences are the only significant deterrent stopping the fish from entering Lake Michigan and gaining access to the Great Lakes and connecting channels.⁶⁰

But the electric fences are not failsafe.⁶¹ In 2010, a bighead carp was caught beyond the fences at Lake Calumet, seven miles (or about 11 kilometres) from Lake Michigan.⁶² In one study, scientists found environmental DNA (eDNA) beyond the electric fence 15 times over a three month duration in 2011.⁶³ There is some debate about whether the eDNA was from live fish or not—their eDNA may have just travelled across the barrier by the way of birds, boats, or other pathways.⁶⁴ However, in light of these recent findings, the U.S. Army Corps of Engineers is exploring options to prevent further movement of the fish into the Great Lakes, including ways to permanently close the manmade link between the Mississippi and Great Lakes basins.⁶⁵

The waterway system is the most likely place for Asian carp to enter the Great Lakes,⁶⁶ but not the only possible entry point. The U.S. Army Corps of Engineers has identified 18 other places where Asian carp could enter the Great Lakes.⁶⁷ All points of entry must be addressed.

CROSS-BORDER TRADE FOR FISH MARKETS

Even if Asian carp could no longer access the Great Lakes through the Mississippi watershed, they could still gain entry to Canadian waters by way of food markets.⁶⁸ Fish sellers harvesting Asian carp from southern U.S. waters are trucking them on ice to fish markets in Ontario, mostly in Toronto.⁶⁹ The federal and Ontario governments prohibit the possession and sale of live Asian carp in Ontario.⁷⁰ But these fish have a special aptitude for surviving for a long time out of water. In one instance, Asian carp that were thought to be dead when crossing the Canada-U.S. border were actually alive, even after being on ice for up to two days.⁷¹ The law does not take into account this freakish zombie-like talent.

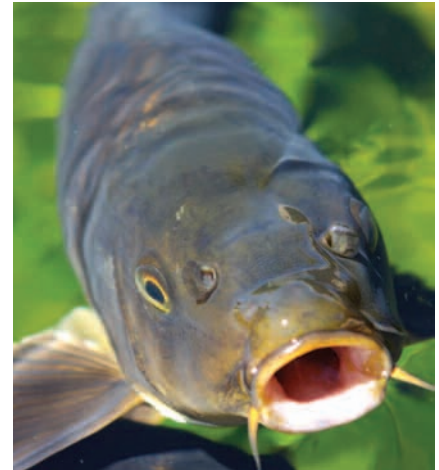


PHOTO: Shutterstock

One of the biggest problems is the gaps in the rules regarding the importation of Asian carp into Canada. For instance, some provinces have not banned the possession and sale of Asian carp, leaving the Great Lakes vulnerable to invasion from within Canada. Federal oversight is needed to provide more consistent regulations that prevent and control invasive species nationally.^{72, 73}

In one instance, Asian carp that were thought to be dead when crossing the Canada-U.S. border were actually alive, even after being on ice for up to two days.

The Chicago Area Waterway System: how a turn-of-the-century sewage system connected two watersheds

During the late 1800s, Chicago released untreated sewage into Lake Michigan near the intake that supplied the city's drinking water. As a result, Chicago had severe drinking water quality problems and ongoing public health emergencies. To prevent further health problems, the city reversed the flow of the Chicago River so that water was diverted from Lake Michigan to flush sewage down the Mississippi through a newly constructed canal. In the end, five points of connection were established between the previously separated Great Lakes and Mississippi watersheds. The present-day Chicago Area Waterway System is used for wastewater discharge, as well as commercial shipping, flood control, and recreational and tour boating. While expensive, separating the watersheds is now possible without creating health problems or contaminating Chicago's drinking water.⁷⁴

BAITFISH

Another way that Asian carp could reach the Great Lakes is if anglers inadvertently use the fish as live bait.⁷⁵ Small Asian carp are easily mistaken for native or non-invasive species, such as shad. Live fish could get into the Great Lakes if they escape while being placed on a hook, or when anglers (illegally) dump unused bait into the lake or river. This is a much larger concern in the U.S. than in Canada, because the fish already live in many U.S. states.⁷⁶ So far, there is no evidence of Asian carp being used as baitfish in Canada but it is important to address this potential pathway of entry.

Underwater electric fences were built in 2002 and 2006 to prevent fish from passing through these waterways. The fences are the only significant deterrent stopping the fish from entering Lake Michigan and gaining access to the Great Lakes and connecting channels.

Who is Responsible for Preventing an Asian Carp Invasion?

In Canada, there is no single agency responsible for invasive species. Instead, provincial and federal governments must work together with bilateral organizations such as the International Joint Commission and the Great Lakes Fishery Commission to prevent new introductions and reduce the impacts of invasive species. Industry, non-government organizations, First Nations, and the general public are also involved through outreach programs and the development of best management practices.⁷⁷

Federally, actions are guided by the national strategy called the *Invasive Alien Species Strategy for Canada* (2004). Environment Canada is the lead agency responsible for implementing priorities for action, but Fisheries and Oceans Canada and the Canada Border Service Agency also play a key role in developing policies, programs and legislation on invasive species.⁷⁸

Provincially, the Ministry of Natural Resources is Ontario's lead agency. They work with the Ministry of Agriculture and Food, the Ministry of Environment and the Ministry of Transportation to undertake activities outlined in Ontario's Biodiversity Strategy (2005).⁷⁹

WORKING TOGETHER TO PREVENT AN ASIAN CARP INVASION ^{80, 81, 82}

STRATEGIC ACTIONS	LEAD AGENCY OR AGENCIES	EXAMPLES OF TOOLS AND PROGRAMS
Legislative and regulatory controls	The Ministry of Natural Resources is primarily responsible for regulating the possession, purchase, sale, use and transport of invasive species. They also regulate which fish can be used for bait and which fish can live in aquaculture facilities.	<ul style="list-style-type: none"> • Fish and Wildlife Conservation Act (S.O. 1997) • Ontario Fishery Regulations (under the federal Fisheries Act, S.O. 1985)
Control efforts including border control	Fisheries and Oceans Canada along with U.S. counterparts have led this effort with support from provincial and state agencies.	<ul style="list-style-type: none"> • To ensure Asian carp crossing the border are not alive, Ontario's Ministry of Natural Resources works closely with the Canadian Border Service Agency and Fisheries and Oceans Canada.
Risk assessment	There is a partnership between federal and provincial governments and industry stakeholders to assess risk.	<ul style="list-style-type: none"> • Assessments of pathways of introduction • Monitoring and training workshops • Invading Species Hotline and website
Research	Numerous stakeholders are involved in research (e.g., universities, international boards of study, non-government organizations, etc.).	<ul style="list-style-type: none"> • The Canadian Aquatic Invasive Species Network is a national consortium of invasive species specialists.
Outreach and education (including identification of Asian carp)	Ontario Ministry of Natural Resources and local partners, including conservation authorities and anglers groups do outreach and education.	<ul style="list-style-type: none"> • The Invading Species Awareness Program is run by the Ministry of Natural Resources, and the Ontario Federation of Anglers and Hunters.
Monitoring and early detection	Various governments and NGOs are involved in monitoring water bodies.	<ul style="list-style-type: none"> • The Ministry of Natural Resources has written a <i>Field Guide to Aquatic Invasive Species</i> and holds training workshops to help people identify Asian carp.

WHAT CAN BE DONE TO KEEP ASIAN CARP OUT OF THE GREAT LAKES?

It is virtually impossible to remove Asian carp once they have become established in a waterway. Therefore, management efforts need to focus on prevention.⁸³ The good news is that there is still time to stop these dreaded invaders from establishing in the Great Lakes ecosystem. A number of options are available, but we must act quickly. Below we describe what is already being done, and what further actions are needed.

CANADA AND ONTARIO'S EFFORTS



What is Canada already doing?

In 2004, the federal government wrote An Alien Invasive Species Strategy for Canada,⁸⁴ and since then, it has completed two risk assessments on Asian carp. In 2012, Ottawa committed \$17.5 million to spearhead federal efforts towards Asian carp prevention, early warning, rapid response, management, and control.⁸⁵ Canada also joined the Carp Regional Coordinating Committee, a binational Asian carp control program.

Federal collaboration with the Ontario government on border control has yielded results. For example, in late 2010, six truckloads (almost 18,000 kg) of live Asian carp intended for markets in Toronto were seized at the Canadian border. Convictions range from \$20,000 to \$60,000 per offence.⁸⁶

What is Ontario already doing?

Prevention is the main goal of Ontario's Invasive Species Strategic Plan. This bodes well for carp control. The agencies involved are conducting research and monitoring in the Great Lakes to detect the presence of carp DNA, and developing rapid response protocols and plans with the federal government, should Asian carp be discovered in Canadian waters.⁸⁷ Several other provincial policies and plans, including the Great Lakes Strategy⁸⁸ and Ontario's Biodiversity Strategy⁸⁹ make it clear that controlling invasive species in the Great Lakes is a priority for the Ontario government.

Ontario has also made it illegal to possess, buy, or sell live Asian carp.^{90,91} Because Asian carp can survive out of water for long periods of time, there is a chance that live fish entering Ontario on trucks may escape into water bodies. The Ontario government proposes a simple clarification: to ensure that Asian carp transported across the border are dead by gutting the fish and removing their organs. This would make border inspections and enforcement easier and simplify regulations for importers.⁹²

The Province has also adapted the fishing regulations to address the carp threat. It's illegal to use carp as baitfish, and to dump live bait in or near water.⁹³ The concern remains, however, because dumping bait is common practice—if unidentified carp are accidentally released as baitfish, they could establish in the Great Lakes. This is a larger concern in the U.S. where juvenile Asian carp can be caught in the wild, sold and used as baitfish.⁹⁴

Ontario is also working with other provinces and U.S. states collaboratively on aquatic invasive species planning. Most recently, as part of the Council of Great Lakes Governors, Ontario identified bighead, silver, black and grass carp as among the “least wanted” aquatic invasive species, and has committed to using executive powers to prioritize action plans and encourage support from federal partners.⁹⁵

WHAT MORE CAN BE DONE BY CANADA AND ONTARIO?

Separate the Great Lakes from the Mississippi Drainage basin

Modifying the Chicago Area Waterway System to restore the natural watershed divide between the Great Lakes and Mississippi River basin will stop Asian carp and other aquatic invasive species from moving between the watersheds. If water doesn't flow between the two basins, invasive aquatic species can't actively or passively move between them.⁹⁶

Great Lakes and St. Lawrence Cities Initiative and the Great Lakes Commission recently published a report that outlines the options and costs for achieving separation of the watersheds. Depending on the method of separation, the report estimates the cost to be between \$3.26 billion US and \$9.54 billion US.⁹⁷ While it is recognized that separation is both possible and desirable, it is far from a done deal. As this report is being written, decision-makers await an Army Corps of Engineers study that outlines all the options available to dampen the carp invasion. Separation will only be one of the options they explore. The U.S. Congress will decide which option to pursue. Although the decision to create a permanent barrier must be made by the U.S., Canadian federal and Ontario governments can push for separation through binational forums such as the Great Lakes Fishery Commission, the Great Lakes and St. Lawrence Cities Initiative, the Asian Carp Regional Coordinating Committee, and the Great Lakes Commission.⁹⁸

Prohibit the importing of aquatic invasive species, including live Asian carp, into Canada

While some provinces, like Ontario, are taking steps to ban the possession and sale of live Asian carp, the federal government of Canada has not yet banned the import of live Asian carp into Canada.⁹⁹ We need federal rules to require risk assessments of aquatic species imported into Canada, especially to determine whether they have the potential to be invasive. This will help prevent the importation of invasive aquatic species that could have serious negative implications for the economy, the Great Lakes ecosystem, and other water bodies that Asian carp could also inhabit.

Improve border enforcement with increased coordination and education

Currently, the Ontario Ministry of Natural Resources is called in to inspect fish trucks for Asian carp as they cross the border to ensure they are not alive.¹⁰⁰ Better training and education for Canadian Border Services Agency staff to identify invasive species, and enforce existing provincial invasive species laws and regulations, will enhance protections at the international border.¹⁰¹ The federal government can provide oversight to the enforcement program and ensure no Asian carp are inadvertently brought across the border.

Prioritize action on Asian carp in the Canada-Ontario Agreement

Another opportunity to strengthen cooperation across jurisdictions is through the *Canada-Ontario Agreement (COA)*. Federal and provincial governments are currently negotiating their roles and responsibilities in implementing the *Great Lakes Water Quality Agreement (GLWQA)*. Updated in 2012, the GLWQA describes how Canada and the U.S. will protect water quality in the Great Lakes with specific attention towards preventing the introduction of new invasive species, among other goals. This agreement could be an important tool to clarify and coordinate the roles and responsibilities of the various agencies involved in invasive species prevention.

Set regulations that require evisceration (gutting) of carp before crossing the border

In January 2013, Ontario proposed that current legislation be amended from “prohibit live possession” to “prohibit unless dead and eviscerated.”¹⁰² We fully support this change, and the speedy education of border enforcement officers. This regulatory change could stimulate similar change across Canada, and across the border.

Improve outreach and communications with anglers and baitfish sellers

Ontario already does a great deal of education with hunters, anglers, and park users. But there is room for improvement in understanding what information anglers and bait harvesters need. For example, you could engage anglers by having them fill out a survey when they purchase their licenses to determine their level of awareness of Asian carp. Creating free educational materials that are appropriate for posting in areas frequented by anglers, such as in marinas and on ice fishing hut walls, could also improve awareness.

Better use of preventative tools would help too. For instance, increasing the fine for possessing carp in bait shops could motivate increased vigilance among bait shop owners. Displaying a “*How to identify Asian carp*” poster could be a licensing requirement for baitfish sellers.



WHAT CAN INDIVIDUALS DO?

Don't buy, sell, or transport live Asian carp

Part of the problem is that, despite the dangers, a few people still buy, sell, and transport live carp into Canada. The Ontario government has tried to address this problem and has made it illegal to possess live Asian carp in Ontario. Report illegal importing, distribution, or sale of live Asian carp at **1-877-TIPS-MNR (847-7667)**, or call **Crime Stoppers** anonymously at **1-800-222-TIPS (8477)**.

Be an educated and responsible angler and bait harvester

Individual actions count. It's illegal to dump the contents of bait containers into the water or within 30 metres of any lake, pond, river, or stream, so always put unwanted baitfish in the garbage and empty your bait bucket water onto dry land. While out on the water, anglers are a critical first line of defence against the Asian carp invasion. Help keep Canada Asian carp-free by providing early detection support. Learn to identify Asian carp species and monitor waters that you fish. Any sightings can be reported to the **Invading Species Hotline** at **1-800-563-7711** or online at **invadingspecies.com**.



It is virtually impossible to remove Asian carp once they have become established in a waterway. Therefore, management efforts need to focus on prevention.

SUMMARY OF RECOMMENDATIONS

What can the governments of Canada and Ontario do?

- * Support a permanent barrier on the Chicago Area Waterway System to keep Asian carp out of the Great Lakes
- * The federal government should prohibit the import of live Asian carp, and any future aquatic invasive species, into Canada
- * Improve border enforcement coordination and education
- * Set regulations that require evisceration of carp before crossing into Canada from the U.S.
- * Improve outreach and communications with anglers and baitfish sellers
- * Prioritize keeping the Great Lakes Asian carp-free in the Canada-Ontario Agreement (an implementation tool of the Great Lakes Water Quality Agreement)
- * Involve industry, non-government organizations, First Nations, and the general public in the development of best management practices for invasive species control

What can individuals do?

- * Learn how to identify Asian carp and report any sightings to Ontario's Invasive Species Hotline at **1-800-563-7711** or online at **invadingspecies.com**
- * Don't buy, sell, or transport live Asian carp for food
- * Be an educated and responsible angler and bait harvester
- * Learn more by watching ENVIRONMENTAL DEFENCE'S Asian carp video at **environmentaldefence.ca/asiancarp**

CONCLUSION

While Asian carp would indeed harm the Great Lakes ecosystem, and recreational and fishing economies, the good news is that there is still time to prevent this from happening. We all have a role to play in protecting the Great Lakes region. Because threats to the lakes do not respect borders, the 40 million people living in the Great Lakes region are united in a similar fate. We can either invest the time and resources now to prevent the invasion of the Asian carp or we can risk the region's ecological diversity, economic prosperity and vitality of hundreds of shoreline communities. The health of the world's largest available freshwater system depends on our ability to work together to protect this internationally significant treasure.

PHOTO: istockphoto.com



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