

8.0 INVASIVE SPECIES AND FISH PATHOGENS MANAGEMENT STRATEGY

Invasive Species

Invasive species are defined as plants, animals and micro-organisms that have been accidentally or deliberately introduced into habitats outside their normal range. Invasive species are those harmful alien species whose introduction or spread threatens the environment, the economy and/or society including human health. These species are able to proliferate because in their new environment they are often free from the predation and competition that would normally limit their distribution and abundance. For the purpose of this document, invasive species will refer to those which have either not yet been introduced into the zone or those which have not become established in some areas. The management of individual species such as northern pike, bluegill and black crappie have previously been addressed.

The [Invasive Alien Species Strategy for Canada](#) (Environment Canada, 2004) identifies numerous pathways for the introduction or spread of aquatic invasive species and diseases that are relevant to Fisheries Management Zone 17. These pathways each represent individual challenges preventing the introduction and spread of species within the zone. The pathways identified include:

- Shipping;
- Recreational Boating;
- Use of Live Bait;
- Aquarium and Water Garden Trade;
- Live Foodfish;
- Unauthorized Introductions; and
- Canals and Water Diversions.

FMZ 17 lakes and rivers are particularly susceptible to the introduction of invasive species. Many of the lakes are connected to Lake Ontario and Georgian Bay via the Trent-Severn Waterway. This connectivity increases the risks associated with species that become established within the Great Lakes. In addition, anglers and recreational boaters are active and mobile within the zone, increasing the potential for the spread of invasive species. The prevalence of waterfront property owners also increases the potential spread of aquatic invasive species through aquariums and water gardens.

The introduction of a new species can have significant effects on the aquatic ecosystem. The spread of zebra mussels (*Dreissena polymorpha*) has increased water clarity and decreased the nutrients available to lower levels of the food chain. This has likely decreased the overall productive capacity of the lakes and contributed to observed fish community shifts, creating more favourable conditions for some species (i.e. bass, muskellunge) and less favourable conditions for others (i.e. walleye). As water clears, the amount of habitat for the

light-sensitive walleye is reduced and predation on young walleye is likely to increase. Water clarity is thought to have a very dramatic effect on the productivity (yield) of walleye in inland lakes (Lester et al. 2004).

Current threats include round goby (*Neogobius melanostomus*) which have had significant negative impacts including reductions in species diversity through competition with and predation on, other fish species in areas where they have become established. Other negative impacts associated with round goby are an increased contaminant burden and potential human health concern for anglers who eat them and the potential link between zebra mussels, goby and botulism outbreaks that have killed hundreds of thousands of waterfowl and fish in the Great Lakes. Gobies feed heavily on invasive zebra mussels and are thought to re-introduce nutrients into the food chain that were previously filtered out by zebra mussels (Bunnell et al., 2005).

Invading species awareness program

In the early 1990s, the Ontario Federation of Anglers and Hunters (OFAH) and MNR established the Invading Species Awareness Program. The program has established the following objectives:

- Raise public awareness of invasive species and encourage their participation in preventing their spread;
- Monitor and track the spread of invading species in Ontario waters through citizen reports to the Invading Species Hotline and the Invading Species Watch Program; and
- Conduct research on the impacts and control of invasive species.

Fish Disease

Many fish diseases are caused by parasites, viruses and/or bacteria that can be considered within the context of invasive species. Throughout the summer of 2007 and 2008, tens of thousands of carp died within the Trent-Severn Waterway. In addition to bacterial infections, koi herpesvirus (KHV) was identified in many of the samples tested. The detection in 2007 represented the first confirmed case of KHV in Ontario. KHV is a fish disease caused by a virus that affects only carp, goldfish and koi. Fish can become infected with the virus as it is passed through close physical contact. When stressed, fish that have become infected with this virus may become sick. Survivors of a disease outbreak may become carriers of the virus, passing it to other fish.

KHV is believed to have moved throughout the world via the ornamental fish industry. The virus was first found in the United States in 1999 and has been associated with large scale carp and koi die-offs in New York State. It is not known how or when KHV arrived in Ontario waters.

In addition to KHV, there are a number of other fish pathogens that have recently been discovered in Ontario. Viral Hemorrhagic Septicemia (VHS) was first identified in 2005 after a die-off of freshwater drum (sheepshead) in the Bay of Quinte in Lake Ontario. The virus has now been found in at least 28 species of fish in the Great Lakes including: walleye, yellow perch, muskellunge, smallmouth bass, rock bass, Chinook salmon, white bass, black crappie, freshwater drum, round goby, gizzard shad, emerald shiner, bluntnose minnow and spottail shiner. VHS has been linked to significant die-offs of muskellunge in the St. Lawrence River and Lake St. Clair. VHS has not yet been found in fishes from the inland waters of FMZ 17.

Largemouth Bass Virus (LMBV) has been identified in bass in Lake St. Clair and the western portion of Lake Erie. In areas where LMBV has been a factor in bass die-offs, the larger individuals in the population have been more susceptible.

The Canadian Food Inspection Agency (CFIA) is dedicated to safeguarding food, animals and plants. The CFIA has the lead for fish disease control in Canada and works with Fisheries and Oceans Canada (DFO), which has the lead for fish research including disease diagnostics and testing at a federal level. The CFIA is in the process of establishing the National Aquatic Animal Health Program (NAAHP), a science-based regulatory program for aquatic animal diseases which will include diseases designated reportable or notifiable in Canada because of their potential impact on trade and our economy. Specifically, the activities of CFIA under the NAAHP will include: protecting the health of the fisheries resources, maintaining a list of regulated aquatic animal diseases, implementation of surveillance and monitoring programs geared towards the early detection of fish diseases, control and eradication of aquatic animal diseases as appropriate, establishing requirements for import and export and sustaining and increasing export market opportunities.

Responses to Invasive Species

Governments are actively working to reduce the threat of invasive species at both a provincial and national level. The Canadian Council of Fisheries and Aquaculture Ministers formed the Aquatic Invasive Species Task Group which developed the Canadian Action Plan to Address the Threat of Aquatic Invasive Species (CCFAM, 2004), an action plan under [An Invasive Alien Species Strategy for Canada](#) (Environment Canada, 2004). At a provincial level, Ontario's biodiversity strategy identifies the implementation of the national strategy and action plans as a priority. Ontario is currently working with other agencies and stakeholders to identify current initiatives underway to implement the national strategy, identify gaps and outline actions to address the gaps.

MNR has the legislative authority to determine rules associated with the bait industry and the use of bait by anglers under the Ontario Fishery Regulations (OFR). MNR has worked closely with the Bait Association of Ontario (BAO) to

address the potential for the spread of invasive species through the live bait industry. Through this partnership, numerous education and awareness tools have been developed, as well as best management practices for the industry. More recently, baitfish licence holders must prepare a Hazard Analysis and Critical Control Point (HACCP) plan to address the threat of invasive species associated with their operations.

The unfortunate reality is that, once an invasive species becomes established within an ecosystem, there are few effective options for control and eradication is often an unachievable goal. The focus must be on preventing the spread of invasive species and fish pathogens. In some instances, MNR has implemented measures to prevent the introduction and spread of non-native species. These include bans on the sale of crayfish and more recently restrictions on the movement of live baitfish by licenced harvesters to prevent the spread of VHS. MNR has prepared Regulatory Guidelines for Bait and Gear Restrictions (toolkit) to streamline the use and description of angling regulations. Currently, there are no specific live bait restrictions in Fisheries Management Zone 17 aside from those that apply across the province. Should further regulations on the use of bait be desired upon review of this Fisheries Management Plan, the Regulatory Guidelines will provide a starting point for consideration.

Responses to Fish Pathogens

Once a disease becomes established, the focus switches to measures to control or slow down the spread of the disease. The government's approach in dealing with viral hemorrhagic septicemia (VHS) is an example.

In 2007, the Minister of Natural Resources established interim measures to control the harvest and transport of live baitfish. These measures were necessary to address immediate risks involving potential spread of VHS into inland waters but they also had a significant impact on baitfish harvesters.

Later that year the Minister announced further actions to control the spread of VHS in Ontario. New measures included:

- Implementing a VHS Management Zone (the 'zone') that contains VHS-positive waters in an area bounded by the provincial road network. The VHS-positive waters include lakes Ontario, Erie and Huron (including Georgian Bay) and their connecting waterways and tributaries up to the first impassable barrier, excluding fishways;
- Operating all fishways as planned and allowing existing manual transfers of fish over barriers into the same watershed;
- Requiring salmon spawn and trout spawn collected from the VHS Management Zone to be disinfected according to the MNR protocol or transferred only to a facility located within the zone;

- Allowing walleye spawn collection from the VHS Management Zone only if the fish are stocked into the zone and the receiving fish culture facility is located in the zone; and
- Allowing baitfish harvesters and dealers in the VHS Management Zone to harvest baitfish, but restrict movement of live baitfish out of the zone.

Management of Invasive Species and Pathogens in FMZ 17

Management Goal

Invasive species and fish pathogens represent one of the most significant stressors on aquatic ecosystems and fisheries resources in FMZ 17. MNR, advised by the FMZ 17 Council, have identified the following management goal:

Prevent the introduction and/or control the spread of invasive species and pathogens within FMZ 17.

The most cost-effective means to achieve this management goal is to prevent the initial introduction of invasive species and pathogens that cause disease in the first place. As highlighted above, many regulations and best management practices help prevent the spread of invasive species; however, there remains an ongoing need for increased public awareness regarding the threats of invasive species and associated regulations.

Management Challenges

CHALLENGE 1.0: Susceptibility of lakes and rivers within FMZ 17 to the introduction and spread of invasive species

OBJECTIVES: *Reduce the risk of the introduction and spread of invasive species and pathogens through each of the identified pathways*

Promote public awareness regarding the threat of aquatic invasive species and pathogens among various resource users

Respond effectively to large-scale fish die-offs

Respond effectively to the introduction of new invasive species

ACTIONS

- **Support the development and implementation of an Aquatic Invasive Species Action Plan for Ontario**
- **Support the development of effective legislation to prevent the introduction and spread of invasive species and fish pathogens (e.g. ballast water control measures)**

- **Ensure compliance of bait harvesters and dealers with Hazard Analysis and Critical Control Point (HACCP) policies**
- **Monitor for the presence of aquatic invasive species and pathogens as a component of the Broad-scale Monitoring Program and promote detection monitoring in all lakes within the zone**
- **Develop a program to monitor the distribution and abundance of aquatic invasive species once they become established in FMZ 17**
- **Increase enforcement emphasis on regulations prohibiting the transfer of live fish**
- **Where consistent with management objectives, promote the harvest of invasive species**
- **Encourage anglers to use live bait captured within the watershed they are fishing**
- **Support existing fish disease surveillance programs (e.g. CFIA surveillance programs for VHS)**
- **Support a surveillance program to enable the early detection of invasive fish pathogens**
- **Explore the use of barriers to protect populations of native species from invasive species, particularly within coldwater stream systems**
- **Reduce the escapement of fish populations from aquaculture facilities including on-line ponds**
- **Communicate the rules and regulations regarding the unauthorized introductions**
- **Continue to work with and support the Invading Species Awareness Program and Invasive Species Monitoring Program at a local level**
- **Review the existing communication and public awareness materials associated with aquatic invasive species and pathogens to identify gaps in the messaging and target audiences**
 - **Identify communications requirements to the Invading Species Awareness Program**
- **Engage local stakeholders (e.g. aquarium stores, marina operators, Ontario Competitive Fishing Council) to ensure invasive species and pathogens messaging materials are accessible and effective**
- **Distribute invasive species and pathogen information materials at public events and other consultation initiatives**
- **Encourage the distribution of invasive species and pathogens information materials at locks along the Trent-Severn Waterway**
- **In the event of a large-scale fish die-off, implement the [Peterborough District Fish Die-off Response Protocol](#)**
- **Develop an invasive species response protocol for FMZ 17**
- **Support research and experimental management activities to control the spread of aquatic invasive species and pathogens**