

The alien invaders on our doorstep

Foreign plants, animals thriving

Ontario's rivers and lakes threatened

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Last fall, scientists dumped a chemical that kills fish into a five-kilometre stretch of the Pefferlaw River, between a small dam and the sandy shallows where it empties into the east side of Lake Simcoe.

Their target was a destructive, bug-eyed pest called the round goby. Their aim: stop it from entering the big, cottage-ringed lake, an hour's drive north of Toronto. Whether they've succeeded probably won't be evident for a few months. In the meantime, they'll anxiously search for evidence.

In the long-running war to keep foreign plants and water creatures out of Ontario's lakes and streams, this is a major battle.

The larger conflict is a multibillion-dollar-a-year effort that not only aims to stop invaders but also attempts to cope with those that have already landed and become a permanent and unwanted fixture in the local environment.

To some extent, the invading species have already won: The Great Lakes, in particular, have been overwhelmed by waves of imports that began in the 1830s, when lamprey eels, which latch on to trout and other victims and suck out their body fluids, slithered from New York's Hudson River, through the newly built Erie Canal in to Lake Ontario. The lamprey has been followed — through design or accident — by a parade of imports, from microscopic bacteria to small crustaceans and sizeable fish, that have overturned life in the five big lakes, wiping out native species and even previous invaders, changing the water quality and creating a web of life that bears little resemblance to the natural state of things.

The zebra mussel and its cousin, the quagga, are among the best known of the recent arrivals. The round goby is also near the top of that destructive heap. Most of the newcomers arrived in the ballast water that foreign ships carry when they're not loaded with cargo. Ballast keeps them steady and seaworthy. But the water they take on in their port of origin often contains plant and animal life. If it's pumped out into the Great Lakes, the hitchhikers go with it.

Only a small percentage of these new arrivals thrive in their new home. But when they do — particularly if no local fish develop a taste for them — the results can be explosive.

Mussels and gobies went from zero to billions in less than a decade. The latest estimate of established invaders totals 170 species.

Canada and the United States are finally enacting regulations to control how ballast water is handled. Transport Canada's new rules — which require fresh water ballast to be exchanged for salt water out in the open ocean — will be imposed this spring.

They were ready to go when the Jan. 23 federal election was called and the work came to a halt. "We're waiting until the system gets back up," says Tom Morris, Transport Canada's manager of environmental protection and marine safety. Morris is optimistic the new government will support the rules, since they were included in the Conservative election platform.

At the same time, in a canal south of Chicago, the U.S. Army Corps of Engineers is set to activate a \$9.1 million (U.S.) electronic barrier intended to stop one of the most feared invaders ever, the voracious and spectacularly prolific Asian carp, from entering Lake Michigan.

'We have to prevent (gobies) from getting established'
Francine MacDonald, Federation of Anglers and Hunters

The carp, which eat huge quantities of algae, were imported from China three decades ago to clean fish farm ponds in the southern United States. Some escaped into the Mississippi River system where their population exploded — in many places, they comprise 99 per cent of the underwater population, by weight. The canal links the Mississippi system with Lake Michigan, and carp are just 90 kilometres from the lake's southern tip. These measures, though, can only attempt to prevent an awful situation from turning into disaster.

On Ontario's inland lakes, rivers and wetlands, the aim is different: While zebra mussels and a long list of other plant and animal species have spread, there is still hope most areas can be kept free of the worst pests.

The first gobies got into the Great Lakes about 16 years ago, when a ship from Eastern Europe dumped ballast water into the St. Clair River, south of Sarnia. The lakes are now thick with them.

They're believed to be partly responsible for the oxygen-depleted "dead zone" that forms each summer near the centre of Lake Erie. They're also a major link in the complex chain

of events that puts toxic botulism into Erie's food web and kills loons and other fish-eating birds by the thousands.

So far, gobies have been found at only two sites beyond the Great Lakes — the Pefferlaw River and the Trent River, near Hastings, in southeastern Ontario.

"If it gets into Lake Simcoe, it's a whole new ballgame," says Beth Brownson, senior invasive species biologist with the province's ministry of natural resources. There would be "virtually no chance of being able to eradicate them.

The attempted cure is controversial. The chemical, Rotenone — derived from the roots of tropical plants and in use for at least 50 years — wipes out all the aquatic creatures that come in contact with it.

"It's the first time in Ontario we've tried to do that with an invasive aquatic species," Brownson says.

Critics argue that it might affect human health. Some object to killing sports fish to get rid of unwanted species, or to destroying any fish at all.

Supporters of the project insist there was little danger. The chemical degrades after a few days.

In any case, there was no other option, says Francine MacDonald of the Ontario Federation of Anglers and Hunters, which works with the province on the campaign against invasive species. "We believe the impacts of round gobies in Lake Simcoe would be so significant that we have to prevent them from getting established."

The new inhabitant would likely wreak havoc on Simcoe's \$200 million annual sports fishing industry. "They eat a lot of bass and trout eggs," and displace other small fish that adults of those species eat, Brownson says. They could also play a part in creating a Lake-Erie-type dead zone and botulism outbreak.

Before the Rotenone was applied last October, about 4,000 other fish were removed from the Pefferlaw River and transplanted into Simcoe — where, a little later, they would have migrated to spend the winter anyway.

If the procedure has worked, gobies will be gone and native fish will soon repopulate the treated water. If gobies have survived the attack, the next step isn't clear.

"We need to assess whether we want a retreatment," Brownson says.

Over at Hastings, the area infested with gobies is too big for chemical eradication, so scientists are trying to lure male gobies into traps by broadcasting recorded mating sounds and spreading sex hormones.

'Generally, what ships introduce is what spreads inland'

Beth Brownson, Ontario natural resources ministry

"We're still in the research phase," Brownson says. "We can't yet say what works, or doesn't. We're scrambling to get information."

Any attempts to eradicate or control invaders — through chemicals, barriers or pulling weeds — run up against regulations designed to protect fish habitat or control pesticides, Brownson says.

So, the battle to keep invaders out of the inland waterways appears, ultimately, to depend on the behaviour of boaters, fishers and cottage owners.

"Generally, what ships introduce is what spreads inland," Brownson says.

Much of the free transportation is provided through carelessness: Many invasive weeds, and creatures like the zebra mussel and a miniature crustacean called the spiny water flea, which aggressively competes with young perch and bass for food, are carried to new homes in bait buckets and bilge tanks, or on boats and fishing gear.

But there are exceptions. A few of the animal invaders were imported as bait fish. Chief among them is the European rudd, a large minnow that, after establishing itself in the St. Lawrence River and the Great Lakes, now threatens to populate interior lakes. In January, one was found in Richmond Hill's weedy Wilcox Lake, the first-ever sighting in an inland Ontario waterway.

Many now-unwanted plants were initially considered desirable, usually as garden ornaments or to spruce up aquariums. Eurasian milfoil, now choking hundreds of cottage-country lakes in mats of vegetation, arrived through the home fish-tank trade. That's likely the same route an equally noxious plant called fanwort took to Kashagog Lake, northeast of Peterborough, the only place in Ontario it has taken hold.

Inevitably, like the rudd and Asian carp, many invaders got beyond their human-imposed confines into the wild where, without the predators that kept them in check back home, they ran roughshod over local species.

Some fishermen still use the rudd as bait: That's likely how at least one landed in Wilcox Lake.

The round goby, though, is an especially frustrating case. While it arrived in ballast, it has actually been carried to new water bodies by anglers who put it on their hooks, live, to attract sports fish.

Since no gobies have been found upstream of the infested mouth of the Pefferlaw River, that's almost certainly how they got there, Brownson says. In August, the province banned the use of gobies as bait. Fishermen caught with one face penalties ranging from confiscation of their equipment to fines up to an improbable \$500,000, and jail time.

Invasive species help each other out. Gobies, for example, eat zebra mussels. So, where mussels go, the big-headed fish are eager to follow. Unfortunately, Brownson says, while gobies enjoy a diet that includes mussels, they don't consume enough to control the population.

"A lot of people think invaders are only a Great Lakes issue," MacDonald says. "But inland lakes are smaller and have fewer native species, so something new can have a big impact, quickly."

The province and the anglers and hunters federation monitor about 200 lakes each year and, while most inland waters remain clear of invaders, each survey finds new sites where they're established. Not surprisingly, the worst infestations are in the Trent and Rideau systems, which are connected to Lake Ontario.

All this means humans must be more careful, MacDonald says.

Bilges and bait buckets shouldn't be emptied into any waterway, she says. Live bait fish shouldn't be imported from anywhere. Weeds should be cleaned off boats and trailers. Even fishing gear can spread invaders. Most aquatic creatures die when they're left in the air, but the eggs of spiny water fleas, attached to fishing line or lures, or embedded in equipment, can survive, dormant, until they're back in a wet place. The best way to eradicate them is to clean gear in hot water.