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A Guide to Canada's Non-Natural Species

YOUTH NATURE KEEPERS

Canadian Council on Invasive Species | Conseil Canadien des Espèces Envahissantes

1. Beech Leaf Mining Weevil
2. Cabbage White Butterfly
3. Canada Thistle
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2 - 3 mm long

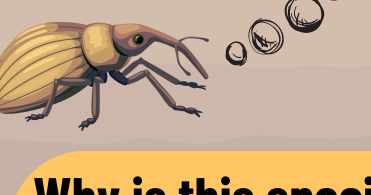
Beech Leaf-Mining Weevil

(Orchestes fagi)

- Black to dark brown
- Golden hairs on body
- Well-developed back legs

How did this species arrive in Canada?

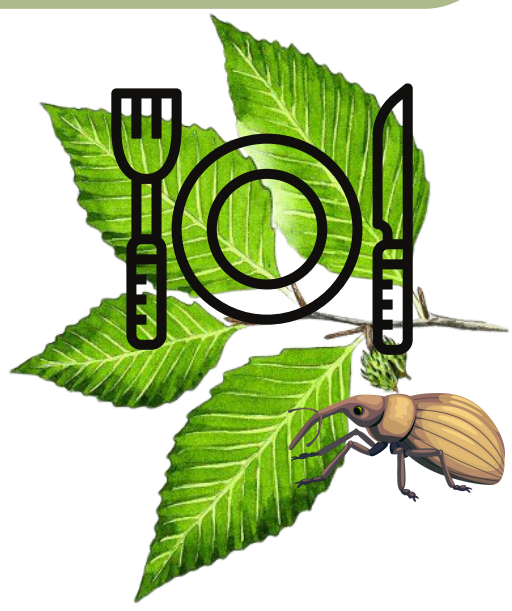
The Beech Leaf-Mining Weevil is native to Europe and appeared in the Atlantic provinces, namely Nova Scotia and Prince Edward Island, in the early twenty-first century. We do not know how they arrived, but experts believe that human activity played a role, as they are easy to transport by accident on living or dead intact or partial host plants. An individual Weevil is easy to miss in a pile of firewood because it's only 1 - 3 mm long.



What kind of role does this species have in their home ecosystem?

In their home ecosystem, this species has a "balanced" diet, also feeding on raspberry, blackberry, birch, apple, cherry, and hawthorn plants in addition to the European Beech Tree. They are therefore a primary consumer who is under control.

Why is this species out of balance with its environment in Canada?



The Beech Leaf-Mining Weevil is out of balance with their environment in Canada because they appear to feed only on the native American Beech Tree. It has been recorded having killed an estimated 64% of an American Beech Tree population. They will also hide among other species of trees, such as American Maple and Red Spruce.

How do we manage it and what kinds of roles could it play in its new environment?

American Beech trees are an important source of wood in the lumber industry, thus it is important to prevent the spread of the Beech Leaf-Mining Weevil. It is best to limit their spread by leaving firewood in situ. In some cases, high value trees can be injected with an insecticide called TreeAzin. Biocontrol methods such as wasp parasitism have not been observed naturally in Nova Scotia.

Click Here for more Information from the Nova Scotia Invasive Species Council

Click Here for more Information from Dont Move Firewood.org

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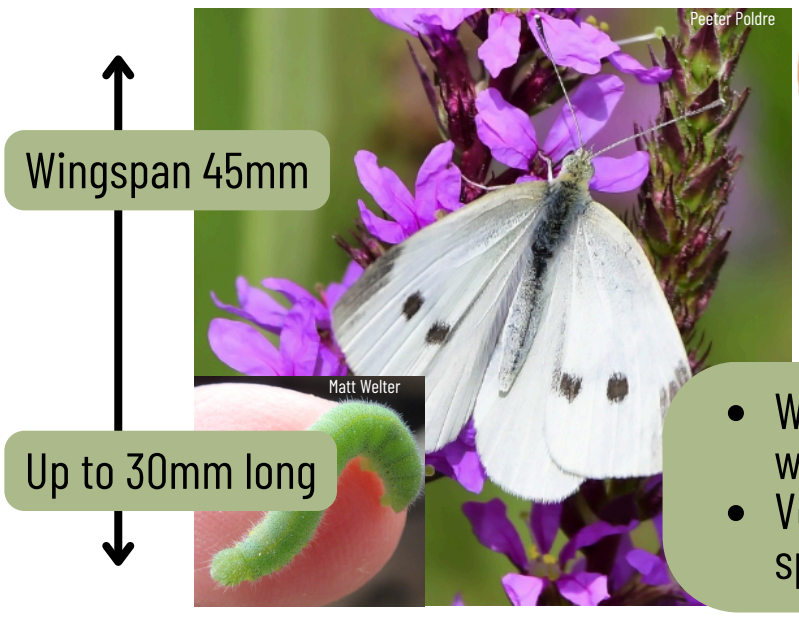
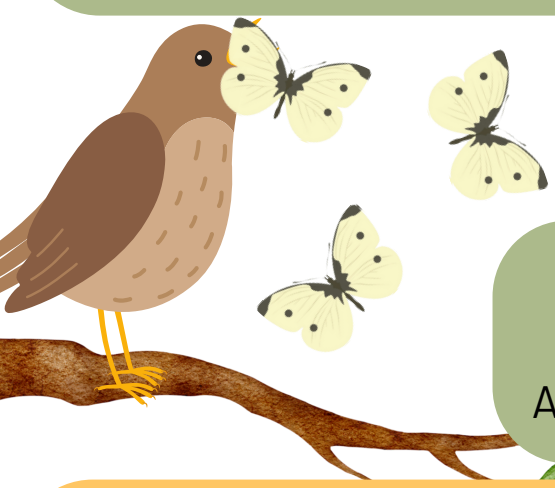


Cabbage White Butterfly
(Pieris rapae)

- White wings, male with 1 black spot, female with 2 black spots
- Velvety green larvae with a row of yellow spots

How did this species arrive in Canada?

The Cabbage White Butterfly was introduced to Canada by accident and unintentionally along trade routes from Europe. The domestication and diversification of mustard crops which are the preferred food source of its larvae. They were first observed in Quebec in 1860 and have since spread across the province

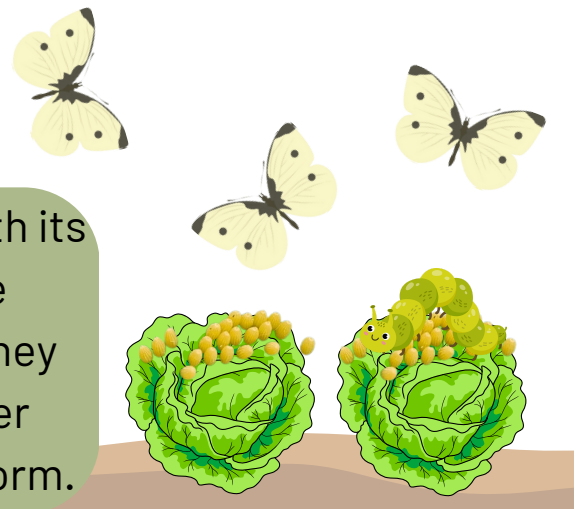


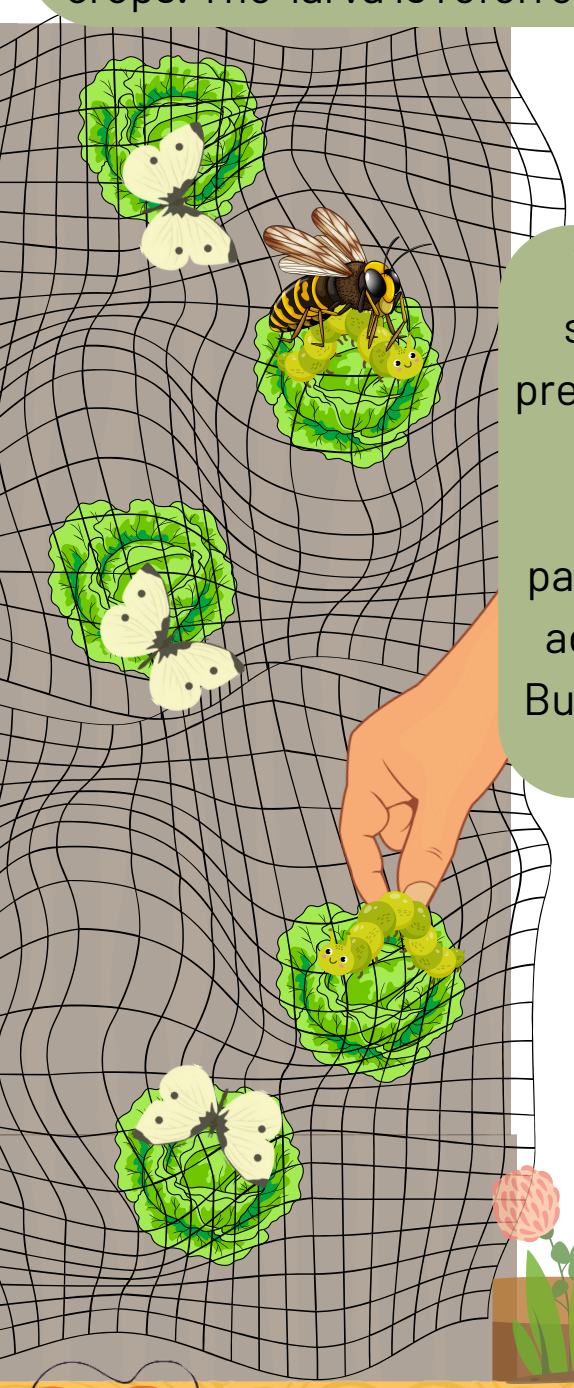
What kind of role does this species have in their home ecosystem?

In their home ecosystem, they are a major food source for birds and other invertebrates. Additionally, the adult butterfly can pollinate crops.

Why is this species out of balance with its environment in Canada?

The Cabbage White Butterfly is out of balance with its environment in Canada mainly because of the negative impacts of its larval stage. As larvae, they can decimate broccoli, cabbage and cauliflower crops. The larva is referred to as the cabbage worm.





How do we manage it and what kinds of roles could it play in its new environment?

The Cabbage White Butterfly can be managed in several ways. Crops can be covered with mesh to prevent adults from depositing eggs. It is important to focus on seedlings and manually remove the caterpillars. In some parts of North America, parasitoid wasps have been introduced as biocontrol agents. In its new environment, the Cabbage White Butterfly is can play the role of a pollinator for garden plants.

Click Here for more Information from Oregon State University

Click Here for more Information from the Electronic Atlas of the Wildlife of British Columbia

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Canada Thistle

(*Cirsium arvense*)

2 -5 ft tall

- Smooth stem
- Leaves with spiny margins and hairy underside
- Flowers white to purple, pompom-like

How did this species arrive in Canada?

The invasive species known as "Canada" Thistle is not actually from Canada but likely originated in the eastern Mediterranean region. Early settlers in North America imported it, and it got its misleading name because New England residents wrongly attributed its arrival to French traders from Canada.

What kind of role does this species have in their home ecosystem?

Native thistles play a vital role in supporting biodiversity. They attract numerous butterfly species and some even use native thistles as host plants for their larvae. Hummingbirds feed on thistle nectar, often competing for it around Western Thistle flowers. Native thistles attract native bees, pollinating flies, beetles, moths, and wasps, contributing to increased biodiversity.

Why is this species out of balance with its environment in Canada?

In several provinces, Canada Thistle is a noxious weed because it is harmful to crops and/or natural areas. This invasive plant has detrimental ecological impacts because it outcompetes native plant species, which is a particular problem in croplands. This invasive plant is also host to agricultural pests such as bean aphids, which can damage crops. Livestock will not eat this plant, allowing for it to spread rapidly. Canada thistle can also be a safety concern as its sharp spines can cause scratches.

How do we manage it and what kinds of roles could it play in its new environment?

As a noxious weed in several provinces, municipalites and landowners must remove Canada Thistle, particularly when it grows in close proximity to crops. Small thistle plants can be removed manually, while larger plants often require the use of a herbicide. In its new environment, Canada Thistle can be expected to increase pollinator biodiversity.

[Click Here for more Information from the Michigan Department of Natural Resources!]

[Click Here for more Information from the Nature Conservancy of Canada]

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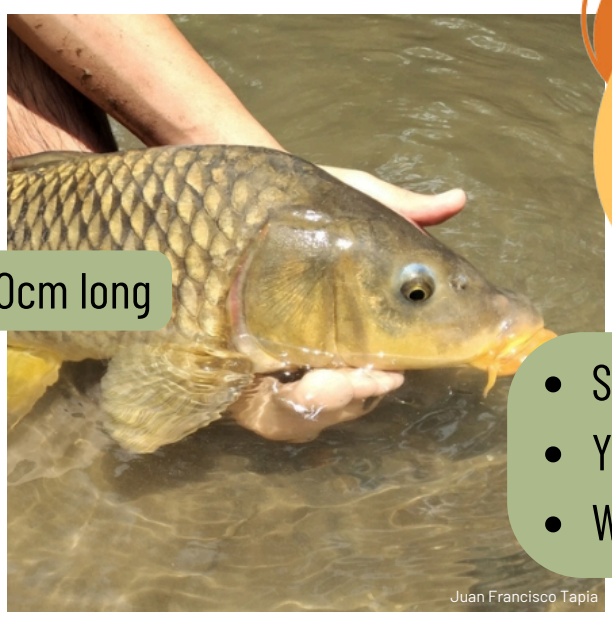


Common Carp

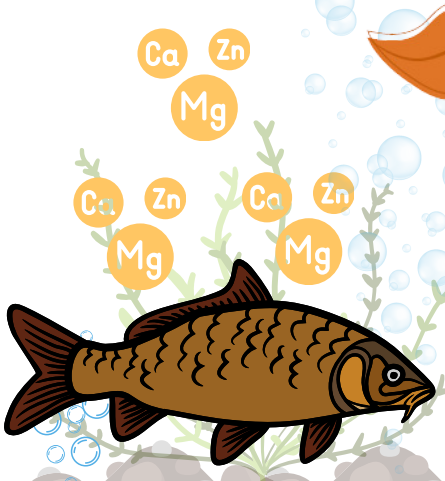
Cyprinus carpio

- Silver to olive-green colour
- Yellowish belly
- Whisker-like appendages at corners of mouth

How did this species arrive in Canada?

The Common Carp is native to the regions of the Black and Caspian seas in Central Eurasia. European and later US-American fishers imported them to their countries to raise them for food. Some US-American growers from states along their country's northern border brought them to Canada more than 100 years ago.

What kind of role does this species have in their home ecosystem?



Common Carp stirs up sediment when they feed at the bottom of the river or lake where they live. If they are not too numerous for their area, the nutrients and organic matter they move between depths in the water column can encourage photosynthesis and thus plant production.

Why is this species out of balance with its environment in Canada?

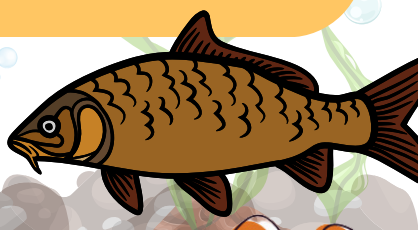
Common Carp feeds at the bottom of the river or lake where they live. They are large enough (adults can measure at least 40 centimetres long and weigh two kilograms) to stir up a large amount of sediment when it feeds. This makes the water murky and reduces the flow of light to the bottom. When they feed, they also uproot benthic plants, reducing the available food for other creatures. A female Common Carp can lay up to 300,000 eggs at once, outbreeding nearly every other species of fish.

How do we manage it and what kinds of roles could it play in its new environment?

Common Carp is nutritious despite its reputation as a 'trash' fish. Fishers, therefore, can catch them, but if they do, they must kill them. Overfishing native fish can harm their populations and make it even harder for them to compete against the Common Carp, but focusing our fishing efforts on the Common Carp can give native fish some room to "aquatically respirate".

Click Here for more Information from the University of Alberta!

Click Here to read an article published in Frontiers of Science!



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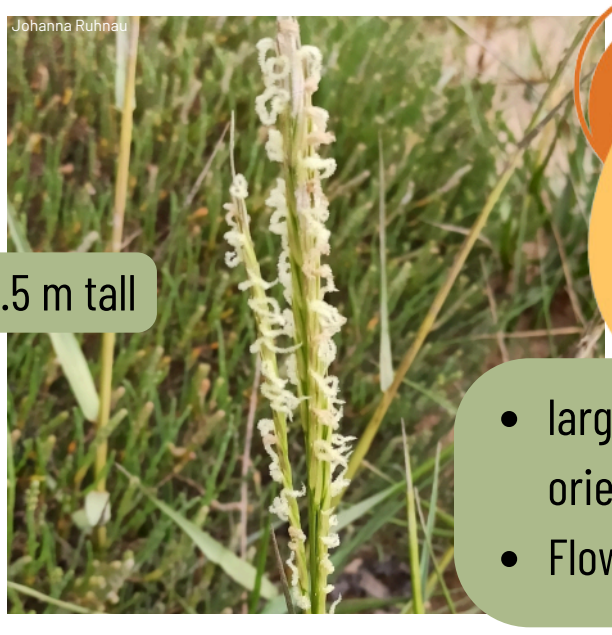

Invasive Cordgrasses (*Sporobolus* spp.)

- large, smooth, often in-rolled leaves, angularly orientated along the stems.
- Flower clusters are 2-24 cm long at top of stem

How did this species arrive in Canada?

Various Cordgrasses can be found along the Atlantic coasts of the Americas, Africa, and Europe. Four Cordgrass species have been found in British Columbia, where they are not native: English Cordgrass, Dense-Flowered Cordgrass, Salt-Meadow Cordgrass, and Smooth Cordgrass. The seeds of Cordgrasses can be spread via birds, animals and oceanic currents. Many of these grasses were intentionally introduced as plantings for erosion control. Other unintentional dispersal pathways include ship ballast water and transport with oyster transplants.

What kind of role does this species have in their home ecosystem?

In their home range, Cordgrasses are a key source of food and shelter for terrestrial and marine mammals, birds, and invertebrates. They help prevent erosion in marshes because their thick roots can penetrate into the peat-based sediment.

Why is this species out of balance with its environment in Canada?

In many regions in Canada, Cordgrasses are out of balance with their environment because they have very thick roots and they can reproduce rapidly through both their seeds and rhizomes. These characteristics prevent other plants—which provide food and shelter to native animals—from growing. They are also associated with an increased risk of flooding, loss to water access at shorelines and disruption of saltwater ecosystems.

How do we manage it and what kinds of roles could it play in its new environment?

Cordgrasses can be controlled by mechanical extraction, biological control, and the application of pesticides. Mechanical control is suitable for smaller populations, but can be counterproductive as the plant can re-establish from rhizome fragments. Larger, well-established populations often need to be managed with the use of an herbicide. In much of the world, they are or have been grown to stabilize banks adjoining bodies of water, avoiding soil erosion; to extract heavy metals and hydrocarbons from soil; to facilitate the sequestration of atmospheric carbon in soil; to produce general-purpose biomass; and to feed livestock.

Click Here for more Information from the Government of British Columbia

Click Here for more Information from the Department of Fisheries and Oceans Canada

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Roots up to 50cm long

European Frog-bit

(Hydrocharis morsus-ranae)

- Leathery, heart-shaped leaves
- Flowers with 3 petal and yellow center
- Unbranched, green roots

How did this species arrive in Canada?

European Frog-bit is native to Eurasia and was intentionally brought to Canada as an ornamental plant to be used in water gardens and ponds. It spreads when plant parts are inadvertently carried between water bodies by aquatic equipment or naturally on the feet of waterfowl. In Canada, it is found in Ontario and Quebec.

What kind of role does this species have in their home ecosystem?

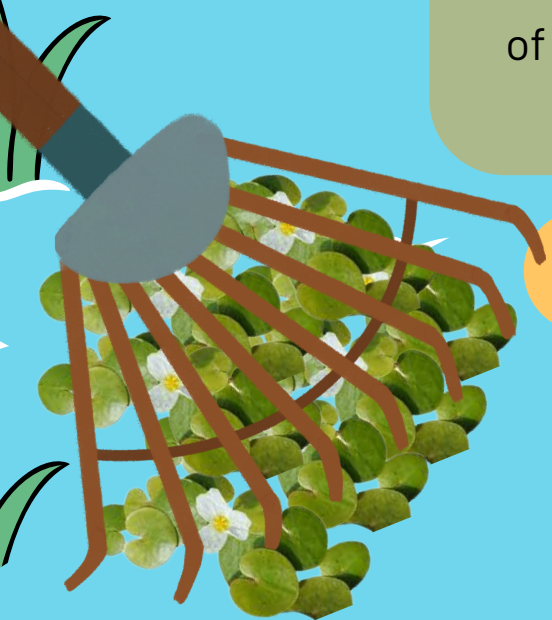
European Frog-bit serves as a source of food for several species of waterfowl, rodents, fish and insects. It is also a common plant used in water gardens and ponds.

Why is this species out of balance with its environment in Canada?

European Frog-bit is out of balance with its environment in Canada for several reasons. It forms very dense mats of vegetation that can reduce the available light for native aquatic plants. This plant can also deplete oxygen levels because it limits the circulation in a waterbody. As a result, European Frog-bit can change the fauna and flora of an ecosystem. This plant is regulated in Ontario as a Restricted species.

How do we manage it and what kinds of roles could it play in its new environment?

Small populations of European Frog-bit can be removed by hand or by raking. Larger populations may require chemical control. European Frog-bit could be a source of food for some wildlife such as waterfowl. It could also provide some cover of insects and fish.



Click Here for More Information from CABI Compendium

Click Here for More Information from the Ontario Invasive Plant Council

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Up to 10cm long

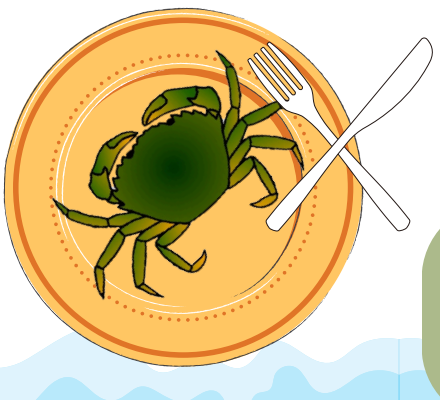
European Green Crab

(Carcinus maenas)

- Green to yellow colour
- Serrated, pentagon-shaped shell
- Hairy, pointed, slightly flattened back legs

How did this species arrive in Canada?

European Green Crab is native to waters off European and North African countries. It was introduced to Canada in the 1800s unintentionally in ballast water of merchant ships from Europe. They are thought to spread through their larval stage which often hitchhike unseen on boats.

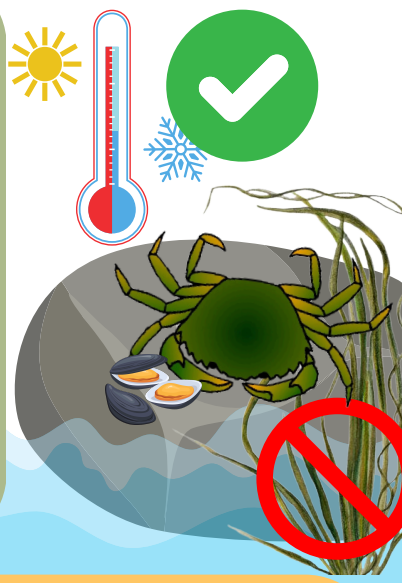


What kind of role does this species have in their home ecosystem?

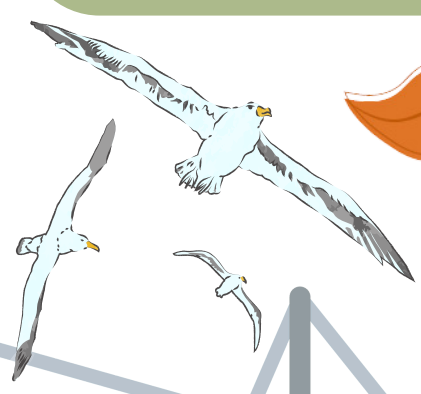
In Europe, where they are simply called Green Crab, they are fished commercially, suggesting it is important as food. They are also often used as fishing bait.

Why is this species out of balance with its environment in Canada?

European green crabs are out of balance with their environments in Canada because they are a prolific breeder (a female can release up to 185,000 eggs per clutch and one or two clutches per year), can tolerate many temperatures and salt percentages in water, and can live out of water for at least five days. They also prey upon native shellfish, crustaceans, and even small fish. Their burrowing has caused bioturbation that has contributed to the mass death of eelgrass on the Atlantic and Pacific coasts. They have no native predators in Canada which allows their populations to grow unchecked.



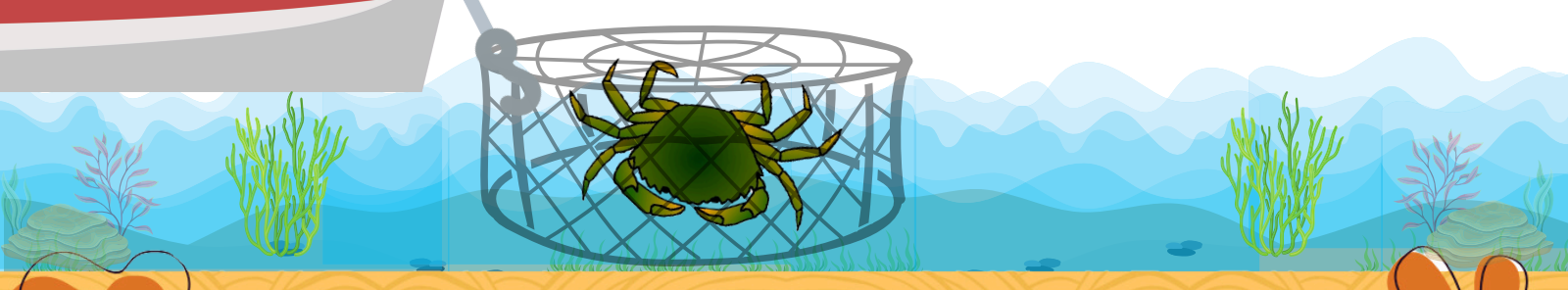
How do we manage it and what kinds of roles could it play in its new environment?



European Green Crab can be controlled in a variety of ways, such as by actively removing them, fishing them, or simply limiting their spread through rigorous inspection and the deployment of physical barriers. In their new environment, they could potentially be used to predate upon pests of aquacultured species such as clams, muscles and oysters.

Click Here for more Information from Department of Fisheries and Oceans!

Click Here for more Information from the Washington Department of Fish & Wildlife



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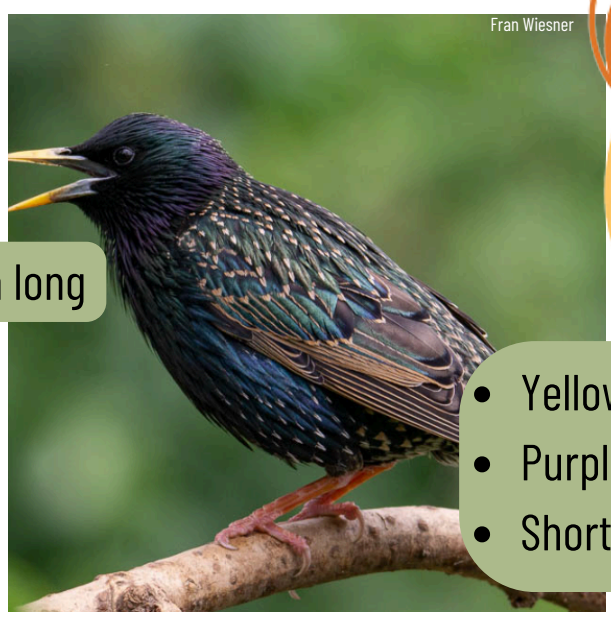


20 - 30 cm long

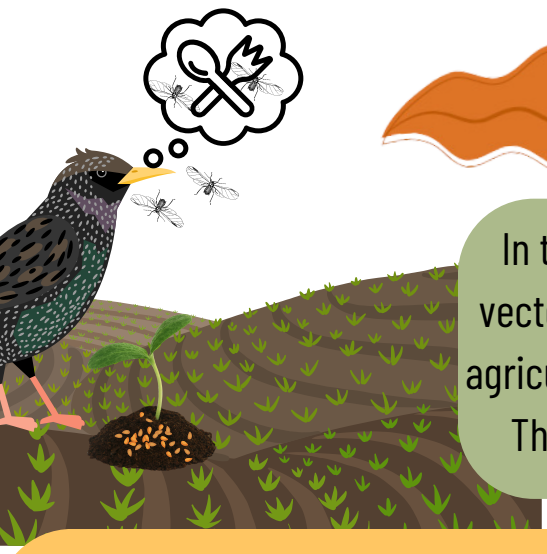
European Starling
(Sturnus vulgaris)

- Yellow beak
- Purplish-green and iridescent feathers in summer
- Short tail

How did this species arrive in Canada?

In North America, European Starlings are all descended from a 100-strong population introduced by Eugene Schieffelin to New York City in 1890–1. An urban legend claims Schieffelin wanted to naturalize all bird species mentioned in William Shakespeare's plays to Canada. They were first noted in Canada in 1919.

What kind of role does this species have in their home ecosystem?



In their home ecosystem, when they eat fruits, they can serve as a vector for seed dispersal. They can also consume pests that threaten agriculture by working to reduce major insects that can damage crops. They are also important source of prey for many small predators.

Why is this species out of balance with its environment in Canada?

European Starlings are out of balance with their environments in Canada for several reasons. First, they are aggressive omnivores and can deplete food sources for other species. Second, they lay an average of five eggs per breeding season and often breed twice per year, allowing for population numbers to drastically increase. Third, they are habitat generalists; they prefer to nest in tree cavities and will repel native birds by filling their cavities with more bedding than native birds prefer. Fourth, they congregate in such large flocks that they displace native birds.

How do we manage it and what kinds of roles could it play in its new environment?

One of the best ways to manage European Starlings is to prevent female birds from breeding in nest boxes. This can be done by ensuring the entrance is too small for starlings to fit. As they are not protected under Migratory Birds Convention Act, you can legally remove nests and directly kill birds. In their new environment, European Starlings could help reduce pests that affect agriculture crops.

Click Here for More Information from The Cornell Lab

Click Here for More Information from Audubon

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Ryan van Huyssteen

Up to 23 cm long

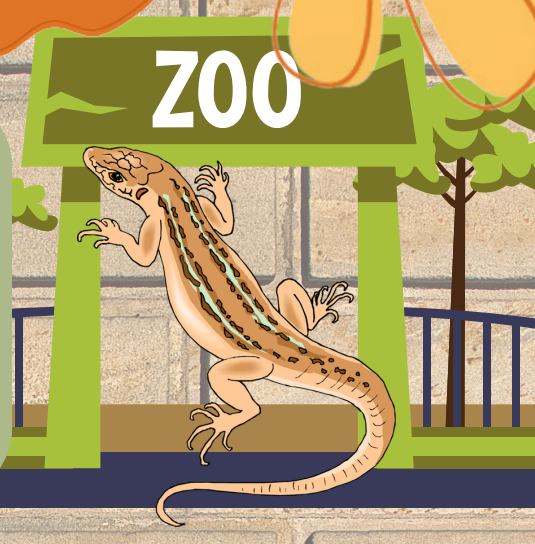
European Wall Lizard

(Podarcis muralis)

- Brown back with green splotches. Males have blue spots on their sides
- Cream-coloured bellies
- Tail twice the length of body

How did this species arrive in Canada?

The European Wall Lizard is native to much of Europe. They were introduced to Canada (British Columbia) between 1957 and 1967; Victoria-area zookeeper Rudy Bauersachs kept a population of them in his menagerie. In 1970, after Bauersachs had to close his menagerie, he released his European Wall Lizards, which began to live outside of captivity after local people supported them.



What kind of role does this species have in their home ecosystem?

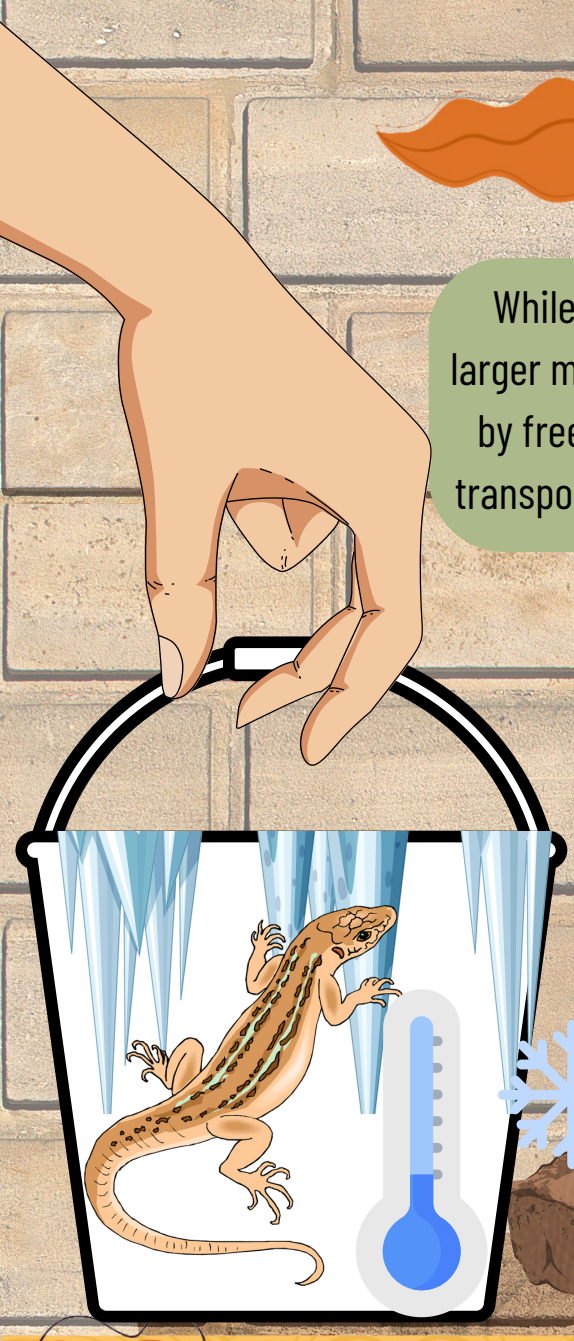
In their home ecosystem, European Wall Lizards are typically prey for raptors, mammals, spiders, and snakes.

Why is this species out of balance with its environment in Canada?

The European Wall Lizard is out of balance with their environment in Canada because they eat invertebrates, fruit, and sometimes even native species of similar ecological niches. They have competitive advantages in breeding over some native lizard species as they can produce multiple clutches of eggs per year.

How do we manage it and what kinds of roles could it play in its new environment?

While they could serve as an important food source for raptors and larger mammals, it is best to trap this lizard.They can be humanely killed by freezing. It is recommended to not possess, breed, release, sell, or transport live European wall lizards as this can contribute to its spread.



Click Here for More Information from the Invasive Species Council of BC

Click Here for More Information from the Canadian Herpetological Society

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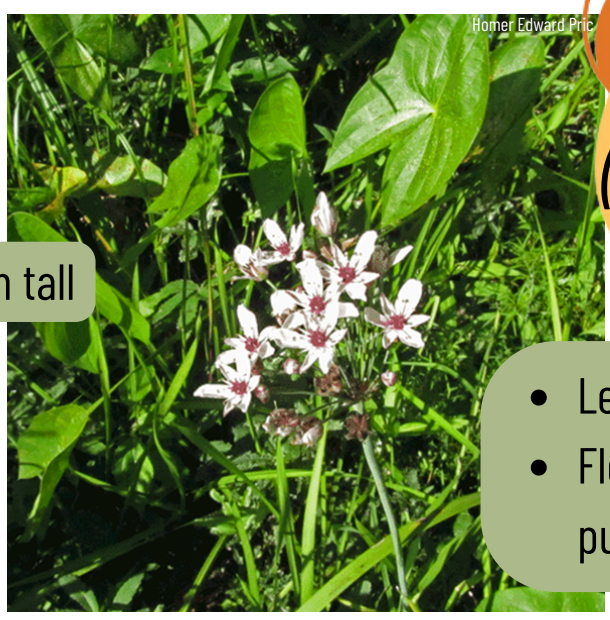

1.5 m - 2 m tall

Flowering Rush
(*Butomus umbellatus*)

- Leaves are triangular in cross-section, 1m long
- Flowers in umbrella-shaped clusters, white to purple

How did this species arrive in Canada?

Flowering Rush (*Butomus umbellatus*), also known as Water Gladiolus or Grassy Rush, is not in fact a true rush. It is actually the only member of the Butomaceae family native to Africa, Asia, and Europe. It was first recorded in North America in 1897 along the shores of the St. Lawrence River near Montreal and was likely first introduced through the emptying of ballast waters of large ships but was also commonly sold as a garden ornamental for many years.

What kind of role does this species have in their home ecosystem?

In their original ecosystem, flowering rush plants are commonly found in wetlands and water gardens, where their visually appealing flowers provide beauty to the landscape. The root can be dried and ground into a starchy powder, which is used in breadmaking in parts of central Europe. They provide food for pollinators and generally do not impede the growth of other native plants.

Why is this species out of balance with its environment in Canada?

Flowering Rush outside of its natural habitat displaces native vegetation, alters water quality, and clogs waterways. As a result, it tends to reduce biodiversity and modify fish habitats. The presence of its thick stands also impacts recreational activities like swimming and boating.

How do we manage it and what kinds of roles could it play in its new environment?

Individual plants or small populations can be managed by hand pulling whereas larger populations will require the use of a herbicide. Research is currently being done to develop biological control agents, including a weevil, a fly, and a fungal agent. None of them has been approved for use in Canada yet. In its new environment, Flowering Rush could overtime become a source of food for pollinators and the roots can be utilized for medicinal purposes.

Click Here to view the Flowering Rush Best Management Practices Guide from the Ontario Invasive Plant Council

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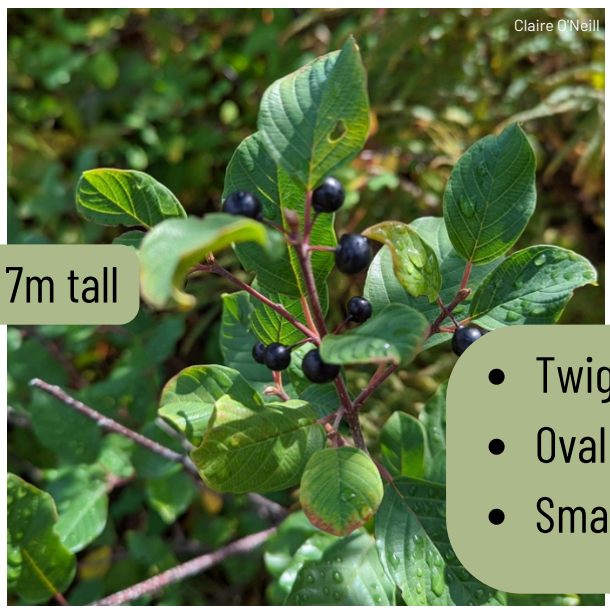

Glossy Buckthorn

Frangula alnus

- Twigs without thorns, yellow inner bark
- Oval leaves with alternate arrangement
- Small white flowers turn into purplish berries

How did this species arrive in Canada?

Glossy Buckthorn was originally introduced from Europe as an ornamental shrub prior to 1800 used in hedgerow plantings and to create shelter for wildlife. It has since become an invasive and aggressive shrub or small tree, capable of reaching heights of up to 7 meters. This hardy plant has adapted to a wide range of habitats, including wetlands, woodland edges, old fields, ditches, and grassy areas, and primarily spreads through seeds which are typically dispersed by birds.

What kind of role does this species have in their home ecosystem?

In its native range, Glossy Buckthorn provides ideal habitat for ground-dwelling animals and birds as the dense thicket it produces shelters them from predators. The flowers of this species attract a wide-variety of pollinators, contributing to overall biodiversity. The fruit produced by Glossy Buckthorn is utilized by many species of birds.

Why is this species out of balance with its environment in Canada?

This fast-growing shrub outcompetes native species by monopolizing light by its dense growth form. It is one of the first species to produce leaves in the spring and the last to lose its leaves in the fall which gives it a longer growing season compared to many native plants. Additionally, Glossy Buckthorn employs allelopathic chemicals from its roots to inhibit the growth of nearby plants, allowing it to quickly colonize an area. Finally, glossy buckthorn is a host for the fungus that causes oak stem rust disease.

How do we manage it and what kinds of roles could it play in its new environment?

The primary goal to control Glossy Buckthorn is to prevent the production and spread of its seeds. This will deplete the seed bank over time. An approach that involves both mechanical and chemical control options is often the most effective way to manage this species. Seedlings and young plants can be hand-pulled. Larger and established infestations often require the use of an herbicide. In its new environment, Glossy Buckthorn may provide ideal habitat for ground-dwelling birds or animals.

[Click Here for more Information from the Michigan Department of Natural Resources]

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A Guide to Canada's Non-Natural Species

YOUTH NATURE KEEPERS

15 - 45 cm long

Goldfish

(Carassius auratus)

- Bright orange to olive green in colour
- Deeply forked tail
- No whiskers at the edge of its mouth

How did this species arrive in Canada?

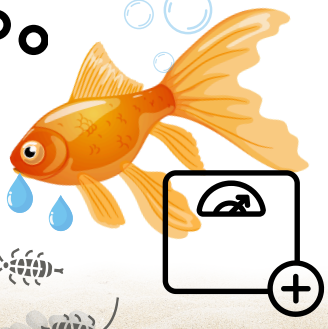
Goldfish are a species of freshwater Carp originally from East Asia. Their beautiful golden colour is the product of selectively breeding Crucian Carp and was first recorded in Imperial China, over 1000 years ago. Today, Goldfish are a common household pet, found in aquariums, pet stores, and also in the wild throughout the world.

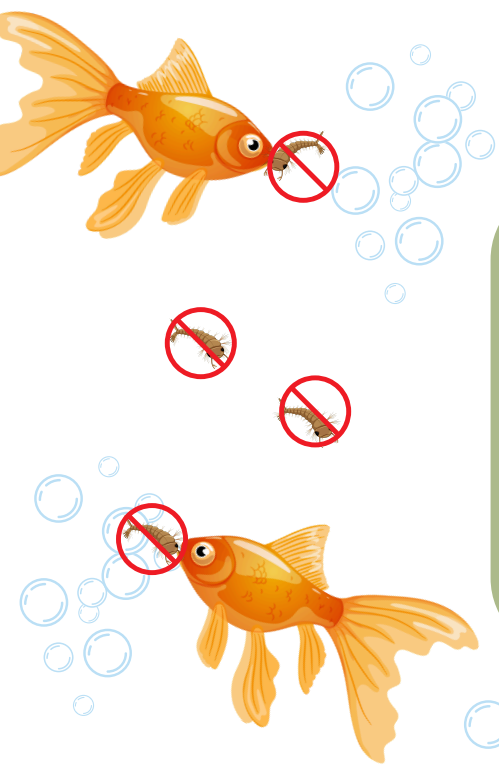
What kind of role does this species have in their home ecosystem?

In their native environments, goldfish stir up sediment which can help suspend nutrients for plants and food sources for other organisms. Goldfish are omnivores and eat a wide variety of organisms, some of which are invasive, helping overall biodiversity.

Why is this species out of balance with its environment in Canada?

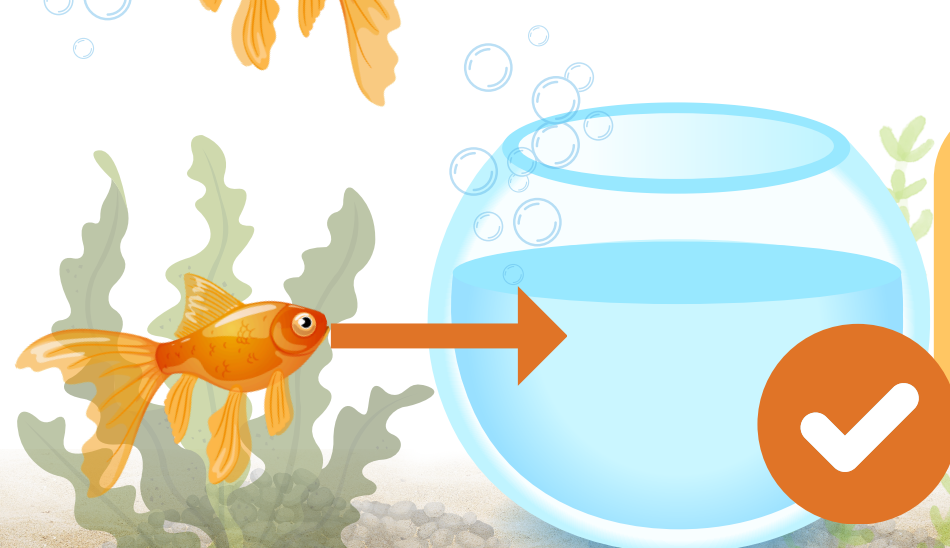
Through the pet trade, goldfish have been introduced across Canada and are then released into local water bodies by humans. Goldfish are aggressive feeders and can grow much larger in the wild than in captivity, feeding on native fish, fish eggs and aquatic plants. As they feed they also stir up sand and mud, clouding the water and preventing sunlight from reaching aquatic plants at the bottom





How do we manage it and what kinds of roles could it play in its new environment?

Because of their voracious eating habits, Goldfish have been used for Mosquito population control, eliminating Malaria Mosquitos and becoming an important food stock in African countries. In Chinese culture, the goldfish is a symbol of surplus and wealth. Although a beautiful fish that makes great aquarium pets, remember to keep them out of the wild and Don't Let It Loose! Chemical control is often the only way to remove this undesirable fish species.



[Click Here for more Information from the Ontario Invading Species Awareness Program]

[Click Here for more Information from the Michigan Department of Natural Resources]

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YOUTH NATURE KEEPERS

Eggs 0.36mm long
Adults: 1.41mm long

Hemlock Woolly Adelgid

(Adelges tsugae)

- Adults are dark brown and covered with waxy coating
- White, woolly egg sacs

How did this species arrive in Canada?

Hemlock Woolly Adelgid (HWA) is native to Asia and was likely brought to North America accidentally on contaminated planting stock. It has been found in Ontario, Nova Scotia and British Columbia. Most of Canada's hemlock trees are at riskof infestation.

What kind of role does this species have in their home ecosystem?

In its home ecosystem, Hemlock Woolly Adelgid feeds on Asian hemlock and spruce species which are resistant and rarely experience mortality.

Why is this species out of balance with its environment in Canada?

Hemlock Woolly Adelgid feeds and kills eastern hemlock trees which are an important tree species in many forests. By doing so, they can alter Hemlock ecosystems which can impact animals that rely on this species for food and shelter and can also result in changes to nutrient cycling. The loss of hemlock trees can make forests susceptible to invasions from invasive plants such as dog-strangling vine.

How do we manage it and what kinds of roles could it play in its new environment?

Hemlock Woolly Adelgid can be managed through prevention, detection and control methods. Do not move firewood and keep eye out for woolly egg masses as this can prevent the spread of this invasive insect. Visual surveys such as ball sampling can help detect Hemlock Woolly Adelgid before it becomes established. Trees infested with this insect are usually cut down and burned on site. Chemical control using an insecticide that is applied to the soil is another common control method. In its new environment, Hemlock Woolly Adelgid causes extreme mortality in eastern hemlock trees as they are not resistant to infection.

Click Here for More Information from Michigan University

Click Here for More Information from Cornell University

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YOUTH NATURE KEEPERS

Up to 2.5 m tall

Purple Loosestrife

(Lythrum salicaria)

- Multi-stemmed, square stems
- Narrow, lance-shaped leaves
- Spike flower cluster, flowers deep pink

How did this species arrive in Canada?

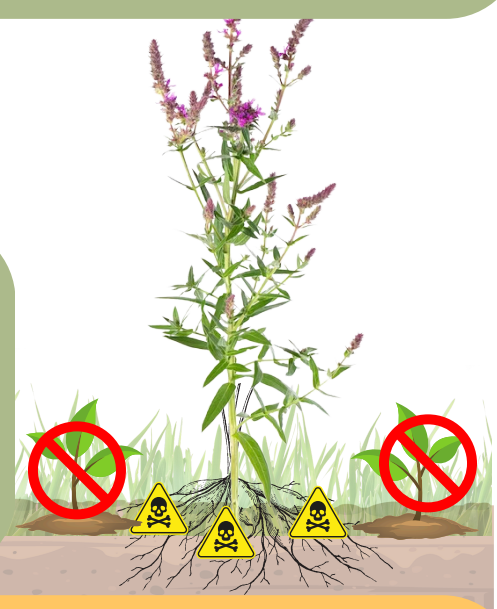
Purple Loosestrife was introduced to North America in the early 19th century both intentionally and unintentionally. In the 1800s, the species was introduced to North America as an ornamental plant and for beekeeping. Purple Loosestrife can spread quickly through contaminated soil and products, having also been introduced to North America by way of discarded soil from European ships and imported wool products. The species continues to spread naturally by way of wind, water, wildlife, and contaminated human clothing and equipment

What kind of role does this species have in their home ecosystem?

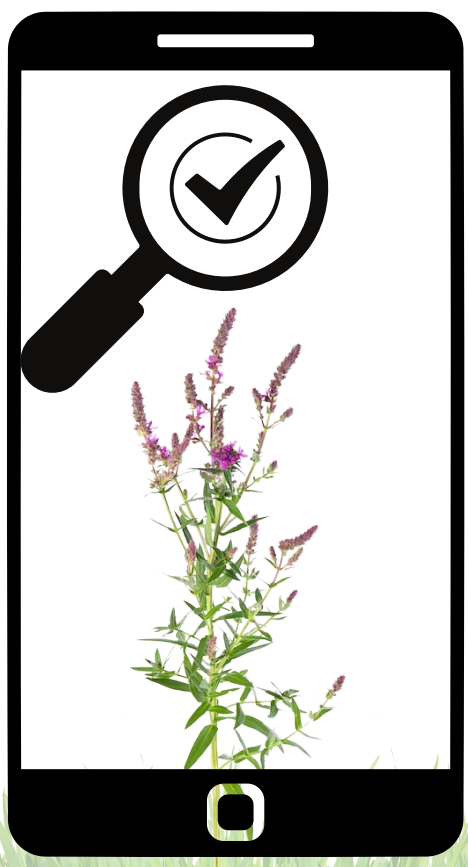
Purple Loosestrife acts as an excellent source for pollinator species including bees, butterflies, moths, and other insects. Purple Loosestrife may be used for medicinal purposes to treat a wide variety of ailments and conditions. Its most common uses include aiding digestive ailments, sore throats, and respiratory illnesses.

Why is this species out of balance with its environment in Canada?

Purple Loosestrife has several negative ecological impacts. It spreads rapidly and produces allelopathic chemicals which alters soil chemistry and prevents the growth of native plant species, thus reducing biodiversity. This poses a particular threat to species at risk who depend on native wetland plants for breeding.



How do we manage it and what kinds of roles could it play in its new environment?



Learning how to identify and remove Purple Loosestrife will help reduce the spread of this invasive plant. In areas where this species is present, it is important to not go off trails or let dogs off leash to prevent the spread of seeds. Eradication of Purple Loosestrife is no longer feasible due to its vast spread. However, there are efforts to manage the spread of the species, including the introduction of two European leaf-eating beetles. Though a highly invasive and competitive species, Purple Loosestrife flowers provide an excellent source of nectar to pollinator species in its new environment.

Click Here for more Information from the Ontario Invasive Plant Council

Click Here for more Information from the Invasive Species Centre

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YOUTH NATURE KEEPERS

12 - 30 cm long

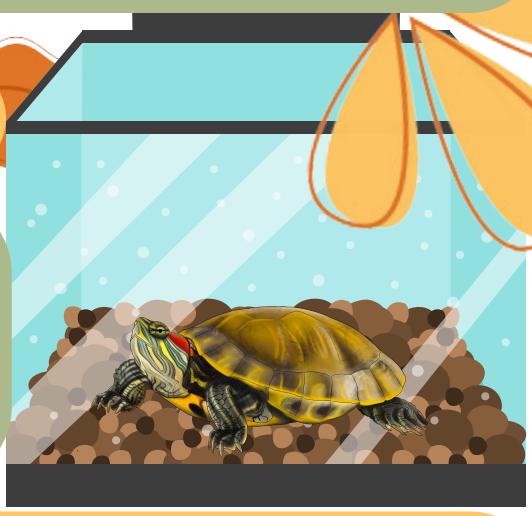
Red-eared Slider

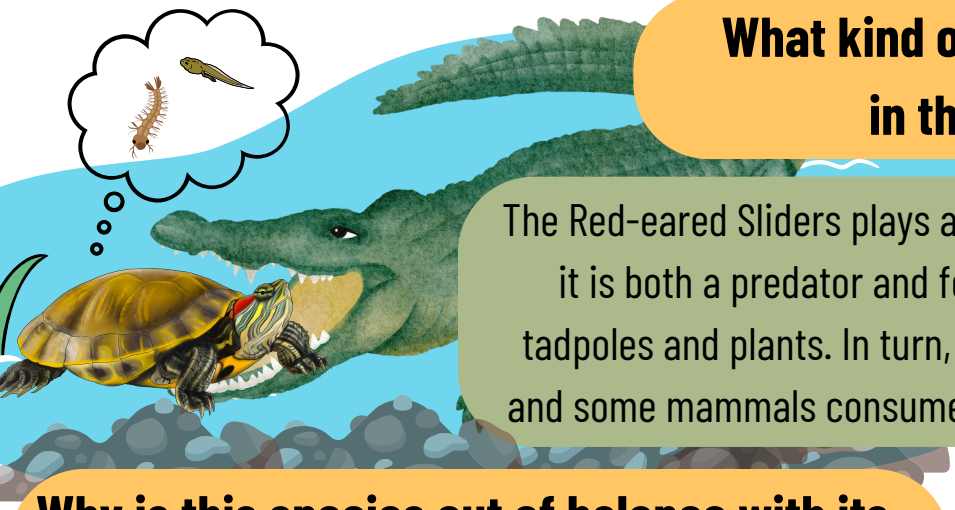
(Trachemys scripta elegans)

- Red patches on either side of the head
- Green stripes running down neck, legs and tail
- Shell and skin are olive to brown

How did this species arrive in Canada?

The Red-eared Slider is native to the South-Central United States. They were introduced to Canada through the pet trade and wild populations that exist in southern Canada are descended from released pets.





What kind of role does this species have in their home ecosystem?

The Red-eared Sliders plays an important role in its home system as it is both a predator and food source. They eat invertebrates, tadpoles and plants. In turn, large fish, birds, crocodilians, snakes and some mammals consume them at various stages of their lives.

Why is this species out of balance with its environment in Canada?

The Red-eared Slider is out of balance with their environment in Canada for several reasons. They compete with native turtles for food and habitat. Red-eared Sliders may also transmit diseases such as ranavirus which poses a significant threat to amphibians and other reptiles. They pose a threat for a long time as one turtle can live up to 20 years.

How do we manage it and what kinds of roles could it play in its new environment?

Under the Aquatic Invasive Species Regulations under the Fisheries Act, it is prohibited to release any aquatic species, such as the Red-eared Slider into a region or body of water where it is not indigenous. Anyone who keeps pet Red-Eared Sliders must keep them in captivity as putting a stop to pet release is the most effective way to manage this species. Where they continue to exist in the wild, though, they may perform six kinds of crucial "ecosystem services": providing biomass to their ecosystem, transferral of energy, mineral sequestration, serving as both predator and prey, dispersing seeds, and bioturbation.

Click Here for More Information from the Nova Scotia Invasive Species Council

Click Here for More Information from the Canadian Wildlife Federation

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YOUTH NATURE KEEPERS

Up to 13 cm long
(not including claws)

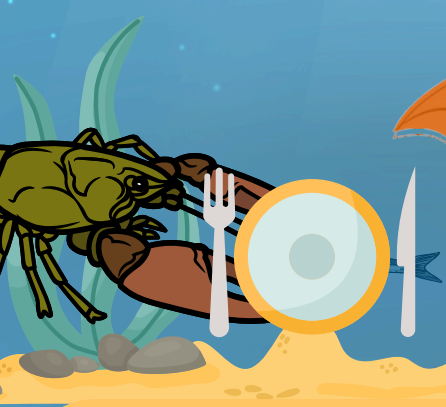
Rusty Crayfish

(Faxonius rusticus)

- Greenish-grey to reddish-brown colour
- Rusty patches on each side of the shell
- Black bands near claw tips

How did this species arrive in Canada?

Rusty Crayfish are native to the Ohio River basin in the south-midwestern United States. They most likely arrived by accident in fishers' bait buckets, through the aquarium trade, or through "natural" range expansion due to such factors as climate change. Now they are found in southeastern Manitoba, parts of Ontario, and south-central Quebec.

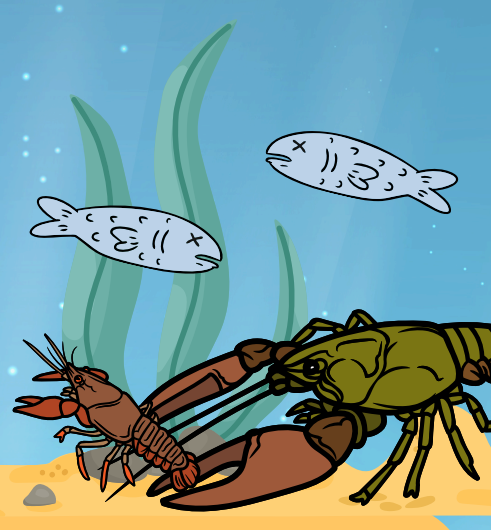


What kind of role does this species have in their home ecosystem?

Like many crayfish, they are a keystone species, feeding at multiple levels of the "food chain".

Why is this species out of balance with its environment in Canada?

Rusty Crayfish are out of balance with their environments in Canada for several reasons. They tend to be bigger, have aggressive eating habitats and spread more rapidly than native crayfish species. They outcompete native crayfish for food and can reduce spawning habitat for native fish species when they consume large amounts of aquatic vegetation. Female Rusty Crayfish can carry fertilized eggs (several hundreds per clutch) under their tails; reducing the likelihood of predators consuming their eggs.

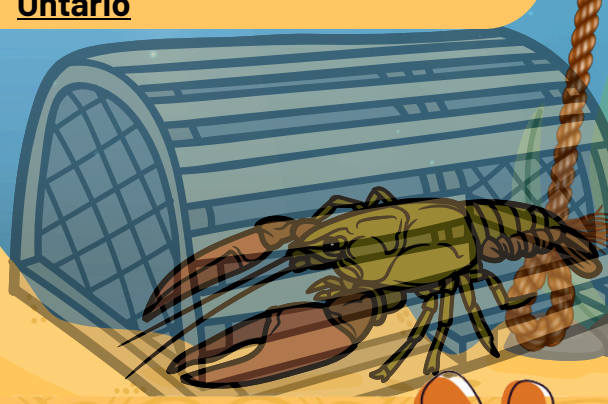


How do we manage it and what kinds of roles could it play in its new environment?

We can use crayfish of all species to evaluate the cleanness of an aquatic ecosystem because they accumulate contaminants. Human trapping reduces their population densities and is most effective by removing female Rusty Crayfish. Reporting sightings of this invasive Crayfish can also help prevent their spread.

Click Here for More Information from CABI Compendium

Click Here for More Information from the Government of Ontario



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YOUTH NATURE KEEPERS

Spiny Water Flea

(Bythotrephes longimanus)

- Very small
- Single, large, black eye
- Single, large tail with one to four spines

How did this species arrive in Canada?

The Spiny Water Flea is an invasive zooplankton and first appeared in Canada in the Great Lakes in 1982. They are native to central and eastern Europe; they arrived in Canada through ballast waters from ships that traveled from Europe. They have spread to all five Great Lakes, several inland lakes in Ontario, west to Manitoba (beginning in 1995), and east to Quebec (beginning in 2014).

What kind of role does this species have in their home ecosystem?

The Spiny Water Flea is an important member in its home ecosystem as it helps regulate the plankton community composition and is an important source of food for native fish species such as salmon. This suggests that their native predators, including fish species like Rainbow Smelt and Alewife, are able to keep populations in check.

Why is this species out of balance with its environment in Canada?

The Spiny Water Flea is out of balance with their environment in Canada, because they consume small, native zooplankton that are important sources of food for native fish species, leading to serious population declines. Because of the namesake Spiny Tail—which, despite being no more than a few millimetres long, takes up at least half their one-centimetre body length—small fish that feed on zooplankton cannot eat it. They can also interfere with fishing because their spines can catch on fishing lines and prevent fish from being reeled in.

How do we manage it and what kinds of roles could it play in its new environment?

There are currently no control methods for the Spiny Water Flea, thus, preventing its spread is critical. The best way to do this is to clean, drain, and dry watercrafts, trailers and other equipment before moving between water bodies. They can serve as occasional food for native North American fish such as walleye and yellow perch.

Click Here for more Information from the Minnesota Department of Natural Resources

Click Here for more Information from the Department of Fisheries and Oceans!

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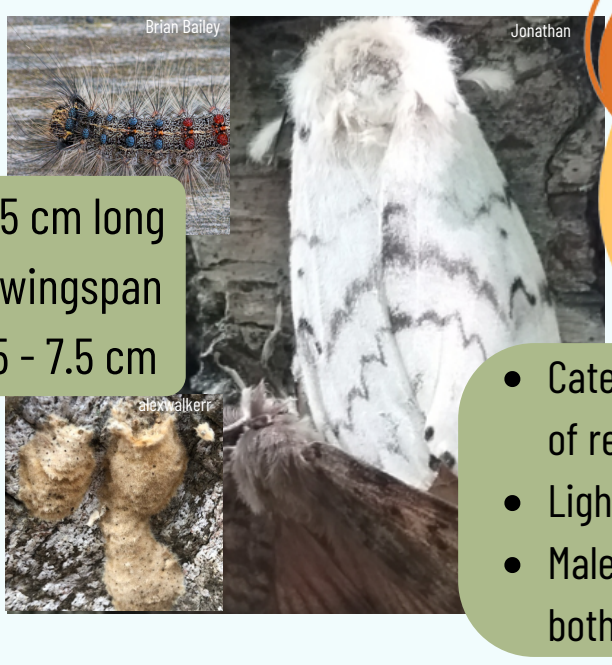
YOUTH NATURE KEEPERS



Larva up to 5 cm long
Adult: 5 cm wingspan
Egg mass: 5 - 7.5 cm

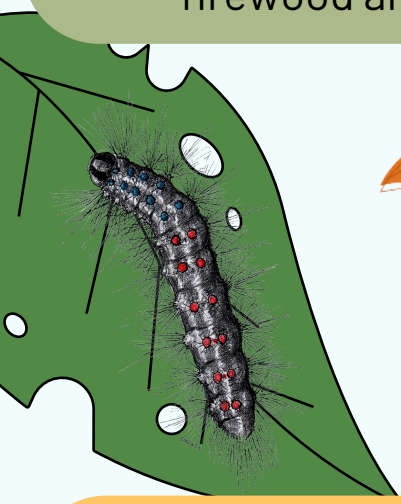
Spongy Moth

(Lymantria dispar dispar)

- Caterpillar with five pairs of blue spots and six pairs of red spots
- Light-brown, "spongy" egg masses
- Male moths are brown and female moths are white, both with black zig-zag markings on their wings

How did this species arrive in Canada?

The Spongy Moth is native to Eurasia and north Africa. It was and was introduced to North America as part of a failed silkworm breeding experiment. In Canada, they are found in Quebec, New Brunswick, Nova Scotia, Ontario and Prince Edward Island. It spreads through the movement of infested firewood and on vehicles from infested areas.



What kind of role does this species have in their home ecosystem?

In its home ecosystem, Spongy Moths feed on many tree species, however, their populations are kept in-check by native predators.

Why is this species out of balance with its environment in Canada?

Spongy Moths are out of balance with their environment in Canada because the destructive larval stage defoliates and kills many tree species. This can reduce the beneficial ecological services provided by trees, impact wildlife habitat and food sources. Overtime, Spongy Moth infestations can change forest tree composition.

How do we manage it and what kinds of roles could it play in its new environment?

It is very important to detect Spongy Moths before infestations become established. This can be accomplished through pheromone-based traps. Small-scale Spongy Moth infestations can be manually removed through scraping and destroying egg masses. Chemical control methods, such as *Bacillus thuringiensis* bacterium spray, can be used to manage larval stage. Spongy Moths cause extensive tree mortality in their new environment and it is best to manage this species.

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Click Here for More Information from the Government of Ontario

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YOUTH NATURE KEEPERS

Up to 1.5 tall

White Sweet Clover

(Mellilotus albus)

- Branched and grooved stem
- Leaves with 3 leaflets
- 20 - 65 small, white flowers

How did this species arrive in Canada?

White Sweet Clover (*Melilotus albus*) is from Eurasia. It was brought to North America as a source of "green manure" for growing crops, and as a source of food for livestock. White Sweet Clover is a "nitrogen fixing" plant which means it is capable of converting atmospheric nitrogen gas (N2) into compounds required for agriculture like nitrates and nitrites.

What kind of role does this species have in their home ecosystem?

The White Sweet clover grows in temperate and tropical Asia and Europe. Apart from its use in agriculture, the plant also serves as a forage crop in slightly more variable climatic conditions; it is able to withstand lower winter temperatures and can grow at high altitudes. It has also been used medicinally as well.

Why is this species out of balance with its environment in Canada?

Efforts to eradicate the White Sweet Clover remain persistent, but so do the plant species. This clover outcompetes similar native plants for resources and thus will thrive while other species dwindle.

How do we manage it and what kinds of roles could it play in its new environment?

Small populations of plants without flowers can be hand-pulled or controlled with repeated mowing. For larger populations, covering the infestation with a tarp for the growing season is typically effective. Persistent infestations often the require the use of an herbicide. The plant's young leaves have a vanilla-like flavour and can be used as toppings and garnish in cooking and baking. White Sweet clover also contains medicinal compounds that can help thin blood, which can be helpful for treating poor blood circulation. Harvesting it responsibly could help mitigate its effects on biodiversity.

Click Here for more Information from Ontario Invasive Plant Council's Best Management Practices Guide for White Sweet Clover

Click Here for more Information from the Minesota Department of Natural Resources

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YOUTH NATURE KEEPERS

Up to 1 m tall

75 - 420 lbs

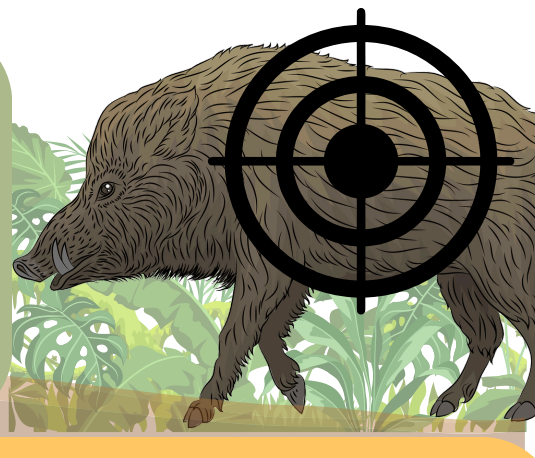
Wild Boar

(Sus scrofa)

- Black to brownish-red to white or speckled
- Long snout, large tusks, wedge-shaped head
- Coarse, thick hair

How did this species arrive in Canada?

Wild Boar, also referred to as wild pigs, were introduced to Canada from Europe in the 1980s as livestock for meat and sport hunting. As a result of these human introductions, Wild Boars have spread throughout the county. Escaped or released Wild Boars, Domestic Pigs, and hybrid offspring of the two have all caused great ecological damage.

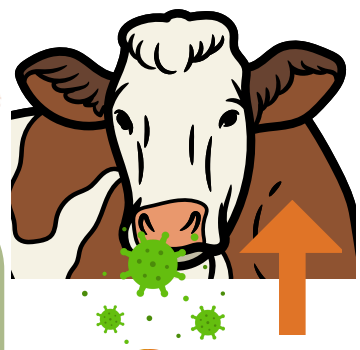


What kind of role does this species have in their home ecosystem?

In their native range, Wild Boars play a role in maintaining biodiversity in tropical forests. They build nests using tree seedlings, often eliminating locally dominant species and encouraging the regrowth of different tree species, inadvertently increasing tree species diversity.

Why is this species out of balance with its environment in Canada?

Wild Boars are out of balance with their environment in Canada because they have extremely high reproductive capacity, omnivorous diet , long life span and are extremely adaptable. The digging and rooting behavior of Wild Boars make them "ecosystem engineers" because they disturb ecosystem structure by altering habitat characteristics. This feeding behavior is very problematic in agricultural lands where they have been found to destroy crops. Wild Boars also carry a significant number of diseases that can be transmitted to domestic animals such as cattle. Because of these negative impacts, Wild Boars are regulated in many Canadian Provinces.



How do we manage it and what kinds of roles could it play in its new environment?

Wild Boar must be reported to proper authorities. Early-detection of free-ranging pigs will help prevent the establishment of this species. Complete removal of populations is challenging and Wild Boar often alter habitat usage after unsuccessful trapping and traps may become useless if pigs can recognize them. In North America, they are not associated with any positive impacts.

Click Here for more Information from the Canadian Council on Invasive Species

Click Here for more Information from Ontario Federation of Anglers and Hunters

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