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# INVASIVE ALIEN SPECIES IN CANADA

CANADIAN ENVIRONMENTAL  
SUSTAINABILITY INDICATORS



Canada 

**Suggested citation for this document:** Environment and Climate Change Canada (2024) Canadian Environmental Sustainability Indicators: Invasive alien species in Canada. Consulted on *Month day, year*. Available at: [www.canada.ca/en/environment-climate-change/services/environmental-indicators/invasive-alien-species.html](http://www.canada.ca/en/environment-climate-change/services/environmental-indicators/invasive-alien-species.html).

Cat. No.: En4-144/65-2024E-PDF  
ISBN: 978-0-660-74104-8  
Project code: EC24019

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# CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

# INVASIVE ALIEN SPECIES IN CANADA

**December 2024**

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# Invasive alien species in Canada

Plants, animals and microorganisms that have moved beyond their native range to a non-native ecosystem are known as alien species. When the introduction and spread of alien species threaten the new environment, economy or society (including human health), they are considered invasive. Invasive alien species can cause environmental and economic damage to our waterways, food supply and natural resources.







For the purposes of this indicator, species are considered "established" when a reproducing population exists in Canada and eradication efforts have been abandoned. They are also considered "regulated" only if regulatory measures are federal in scope.<sup>1</sup>

This indicator reports the number of federally regulated invasive alien species that have become established in Canada since 2012.

## Key results

- From 2012 to 2023,
  - Five (5) new federally regulated invasive alien species have been found to be established: European cherry fruit fly, box tree moth, Japanese stiltgrass, carnation tortrix and oak wilt
  - One (1) new non-federally regulated invasive alien species has been found to be established: strawberry blossom weevil

**Figure 1. Known newly established invasive alien species by year of detection, Canada, 2012 to 2023**

Year	Invasive alien species	Federally regulated
2016	 European cherry fruit fly ( <i>Rhagoletis cerasi</i> )	✓
2018	 Box tree moth ( <i>Cydalima perspectalis</i> )	✓
2019	 Japanese stiltgrass ( <i>Microstegium vimineum</i> )	✓
2020	 Strawberry blossom weevil ( <i>Anthonomus rubi</i> )	
2021	 Carnation tortrix ( <i>Cacoecimorpha pronubana</i> Hubner)	✓
2023	 Oak wilt fungus ( <i>Bretziella fagacearum</i> )	✓

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[Data for Figure 1](#)

**Note:** The list does not include invasive alien species that were established in Canada prior to 2012. Species are considered "established" when a reproducing population exists in Canada and any eradication efforts have been abandoned.

**Source:** Canadian Food Inspection Agency, Environment and Climate Change Canada, and Fisheries and Oceans Canada (2024).

The [European cherry fruit fly](#) (*Rhagoletis cerasi*) originated in Europe and parts of Asia. The larvae of this insect feed on the fruit pulp of cherry and honeysuckle plants, causing the infected fruit to rot. If left uncontrolled, the European cherry fruit fly can result in crop losses of up to 100%.

<sup>1</sup> The [Aquatic Invasive Species Regulations](#) list a number of aquatic invasive species (for example, zebra and quagga mussels) that are subject to prohibitions and controls only at the sub-national level.

The [box tree moth](#) (*Cydalima perspectalis*), originally from Asia, infects boxwood plants. There are no native boxwood species in Canada, but they are sold and planted in urban areas as ornamental plants. When plants are infested, they lose leaves and get covered in webbing from the larvae, making them look damaged.

[Japanese stiltgrass](#) (*Microstegium vimineum*), originally from Asia, is an annual grass that easily spreads along the ground of forests and wetlands. Due to its fast growth, it easily outcompetes native plants. This can result in [habitat loss for native species and altered soil chemistry](#).

[Carnation tortrix](#) (*Cacoecimorpha pronubana* Hubner) is a moth native to North Africa. It infects more than 160 species, including fruit-bearing plants like strawberries, grapevines, pears, stone fruit trees (such as cherries and plums) and ornamental flowers like roses. [Infestation lowers the productivity and commercial value of affected plants](#).

[Oak wilt](#) is a disease that affects oak trees. It is caused by the infestation of the *Bretziella fagacearum* fungus. Infestation causes tree death, which can lead to biodiversity loss in affected areas as well as loss of income in the forestry sector.<sup>2</sup>

### Status of invasive alien species in Canada

Hundreds of alien species are found in Canada, including many familiar species that have been present for many decades.<sup>3</sup> Their presence does not always pose a risk. However, when they threaten human health, the economy or the environment they were introduced to, they are identified as invasive. Examples include common weeds like [Canada thistle](#), backyard birds such as [European starlings](#), diseases like [West Nile virus](#),<sup>4</sup> and pests that damage crops and forests, such as [Oriental fruit moths](#) and the [emerald ash borer](#).

As of 2023, a total of 255 [invasive plant pests](#) as well as 4 Asian carp species ([bighead carp](#), [black carp](#), [grass carp](#) and [silver carp](#)) were federally regulated to prevent their establishment or control their spread in Canada. This number is not a complete count of all known invasive alien species in Canada; for example, regionally regulated invasive alien species and native species that are invasive outside of their natural range are excluded. For more information, consult the [Caveats and limitations](#) section.

### Actions taken to regulate invasive alien species

Trade and travel increase the risk of invasive species entering Canada. Federal regulations can be designed to control their introduction or spread. Regulatory actions may focus on:

- High-risk species, such as [Asian carp](#) or [spotted lanternfly](#)
- Potentially invasive non-native species for which regulation can be effective
- High-risk pathways, such as [ballast water](#) in ships and import of plants, plant products and animals

Some pathways, regardless of risk level, cannot be controlled; for example, animals can fly or walk across borders.

The regulation of invasive and potentially invasive species is intended to prevent their introduction and establishment, or to control their spread in Canada. This can be done through intervention, response or management plans, frameworks and strategies. These various measures prescribe actions such as import requirements including bans, the inspection of goods before shipping or the application of pest-control measures before shipments are allowed into Canada.

The [Invasive Alien Species Strategy for Canada](#) seeks to safeguard Canada's native biodiversity and protect domesticated plants and animals from invasive alien species. The strategy's hierarchical approach prioritizes:

1. Prevention of new invasions
2. Early detection of new invaders

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<sup>2</sup> Invasive Species Centre. [Oak wilt \(\*Bretziella fagacearum\*\)](#). Retrieved on September 9, 2024.

<sup>3</sup> Pagad S (2022) [Global Register of Introduced and Invasive Species - Canada](#). Version 1.2. Invasive Species Specialist Group ISSG. Retrieved on October 2, 2024.

<sup>4</sup> Invasive alien species that directly threaten human health are covered under existing human health programs and are excluded from the scope of this indicator.

3. Rapid response to new invaders
4. Management of established and spreading invaders (containment, eradication and control)

The best method to prevent the spread of invasive alien species is to prevent their entry into the new environment. If this is not possible, early detection and rapid response measures are essential to prevent their spread and establishment. When actions are taken in a timely manner, it is possible to prevent the establishment of invasive alien species. For example, the [Asian longhorned beetle](#) (*Anoplophora glabripennis*), initially discovered in 2013 in Toronto and Mississauga, was successfully deemed eradicated in 2020 after 5 years of no detections.<sup>5</sup> It is still regulated to this day to ensure that future introduction and establishment events are prevented.

## About the indicator

### What the indicator measures

The Invasive alien species in Canada indicator reports the number of federally regulated invasive alien species that have become established in Canada since 2012. Species are considered "established" when a reproducing population exists in Canada and any eradication efforts have been abandoned.

### Why this indicator is important

Alien species are species that have been introduced outside their natural past or present distribution through human action.<sup>6</sup> Invasive alien species are alien species that are harmful and whose introduction or spread threatens the environment, the economy or society, including human health.<sup>7</sup> Alien bacteria, viruses, fungi, aquatic and terrestrial plants, mammals, birds, reptiles, amphibians, fish and invertebrates (including insects and molluscs) can all become invaders.

The expansion of global links through trade and travel increases the risk of invasive species being introduced. The number of new invasive species arriving from foreign countries and establishing in Canada is one measure of our effectiveness in minimizing the potential damage from these species. The regulatory status of these species and their arrival pathways, when known, provide information on what weaknesses in risk management need to be addressed.

### Impact of invasive alien species

Invasive alien species can influence ecosystem function in their new environment, which can lead to negative effects on ecosystems, human well-being and costs to the economy.

Invasive alien species are a threat to biodiversity. In their new ecosystems, they become predators, competitors, parasites, hybridizers and diseases to our native and domesticated plants and animals. They can easily outcompete native species for resources or alter the environment and render it unsuitable to native species. For example, the [European green crab](#) (*Carcinus maenas*) is an invasive alien species found in marine environments in British Columbia, Quebec (the St. Lawrence River) and the Maritime provinces. It limits resources for other crustacean populations and predated on native bivalve populations. It also disrupts eelgrass beds which are habitats for many important juvenile fish species, such as wild salmon. Overall, the presence of invasive alien species can put native species at risk of extirpation. In fact, invasive alien species contributed to 60% of recorded extinctions worldwide and are the only driver for 16% of recorded extinctions.<sup>8</sup>

They can also negatively affect our ability to benefit from the local environment and our well-being. For example, [invasive phragmites](#) are plants that devastate wetlands and shorelines around the Great Lakes. Their presence

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<sup>5</sup> Canadian Food Inspection Agency (2020) [Asian longhorned beetle – \*Anoplophora glabripennis\*](#). Retrieved on September 9, 2024.

<sup>6</sup> Environment and Climate Change Canada (2004) [Invasive alien species strategy](#). Retrieved on June 5, 2024.

<sup>7</sup> Invasive alien species that directly threaten human health, such as the [West Nile virus](#), are covered under existing human health programs and are excluded from the scope of this indicator.

<sup>8</sup> Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (2023) [Thematic Assessment Report on Invasive Alien Species and their Control](#). Retrieved on October 2, 2024.

limits access to shores and streams for recreational activity and increases fire hazards in affected areas. Other invasive alien species can also directly threaten human well-being, such as the [giant hogweed](#) and [wild parsnip](#), both of which can cause serious skin conditions when in direct contact with the sap.

In addition to environmental damage, managing these species and reducing and mitigating their impact cost billions of dollars each year. For example, [invasive plants](#) reduce agricultural productivity and increase the cost of weed control, such as pesticides and manual removal.

The best way to avoid this is to prevent their arrival in Canada. Actions to reduce the risk of invasion may be taken here at home, at our borders and even in other countries. See [Related information](#) for more.

## Related initiatives

The indicator will help measure progress towards Target 6 of [Canada's 2030 Nature Strategy](#): "Invasive alien species." This target is related to the [Kunming-Montreal Global Biodiversity Framework](#) Target 6: "Eliminate, minimize, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by identifying and managing pathways of the introduction of alien species, preventing the introduction and establishment of priority invasive alien species, reducing the rates of introduction and establishment of other known or potential invasive alien species by at least 50 percent, by 2030, eradicating or controlling invasive alien species especially in priority sites, such as islands."

## Related indicators

The [General status of wild species](#) indicator provides an indication of the overall state of biodiversity and a snapshot of non-native species present in Canada.

## Data sources and methods

### Data sources

Data from the Canadian Food Inspection Agency, Fisheries and Oceans Canada, and Environment and Climate Change Canada have been collated to support the indicator.

Data are also reported to these agencies from other sources actively working towards the control of invasive species, including:

- Agriculture and Agri-Food Canada
- Canada Border Services Agency
- Natural Resources Canada (Canadian Forest Service)
- Parks Canada Agency
- Provincial and territorial government organizations
- Non-governmental organizations

### Methods

Federal agencies and departments may become aware of new species in Canada through the normal course of business or through searches of public information. Once a new species is identified, government scientists determine whether it is from outside the country, the extent of its presence and distribution, and whether it has the potential to cause harm.

Data on new invasive alien species and their origin are collected from available sources. Unregulated species reported in the indicator are non-native species that are present in Canada and that may become regulated following review. The indicator is a simple count of the number of invasive alien species in each category found to be established in Canada since 2012.

In cases where a group of species is regulated as a unit, the unit is treated as a single regulated species for the purposes of the indicator.

## Caveats and limitations

The indicator includes species that are discovered and determined to have become established since the baseline year. Species known to have become established in Canada prior to 2012 are thus not included. Species that are native to a region in Canada that are invading elsewhere in Canada are not included, even if these species are federally regulated. Furthermore, range extensions of species native to the United States are not considered invasive and are also excluded from the indicator.

Newly detected species may be subject to an eradication effort. These species are not deemed to have become established unless eradication has failed and efforts have been abandoned. As such, these species are also excluded from the indicator.

Some species are more difficult to detect and identify than others and, as a result, data gaps may exist. For example, microorganisms are generally not detected unless they cause disease.

In general, there are no active field searches for new invasive alien species, but surveillance is undertaken for some species. For example, species that are federally regulated but not present in Canada are monitored to ensure that introduction events are prevented. Species may be federally regulated before introduction if analysis suggests that they can become invasive.

Regulated refers only to federal regulations and federal regulatory status. Terminology may differ between federal regulations, as well as between such regulations and the current indicator. For example, the implementation of the *Plant Protection Act* is heavily informed by processes, concepts and guidelines established under the International Plant Protection Convention, including the [standards that guide the determination of pest status](#).

While invasive alien species can also affect human health, the human health dimension is largely covered under existing human health programs and is excluded from the scope of [An Invasive Alien Species Strategy for Canada](#), and thus from this indicator.

Alien species may be present without becoming invasive, and it may take some time to recognize whether a species is invasive.

Comparisons to other data sources should be made with caution. In particular, counts may not match other sources because related species may be regulated as a group, because some members of a group may be established while others are not, or because species may be regulated under more than one piece of legislation.

## Resources

### References

Canadian Food Inspection Agency (2024) [List of pests regulated by Canada](#). Retrieved on June 5, 2024.

Environment and Climate Change Canada (2004) [Invasive alien species strategy](#). Retrieved on June 5, 2024.

Fisheries and Oceans Canada (2021) [Identify an aquatic invasive species](#). Retrieved on June 5, 2024.

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (2023) [Thematic Assessment Report on Invasive Alien Species and their Control](#). Retrieved on October 2, 2024.

Invasive Species Centre (2024) [Meet the Species](#). Retrieved on June 5, 2024.



## **Related information**

[A Canadian Action Plan to Address the Threat of Aquatic Invasive Species](#)

[About aquatic invasive species](#)

[Convention on Biological Diversity](#)

[Invasive Species](#)

[Invasive Species Centre](#)

## **What can you do to help?**

[Care for the land: Parks Canada works to control invasive alien species](#)

[Preventing aquatic invasive species](#)

[Stop the spread and help keep invasive species out of Canada](#)

## Annex

### Annex A. Data tables for the figures presented in this document

Table A.1. Data for Figure 1. Known newly established invasive alien species by year of detection, Canada, 2012 to 2023

Year	Invasive alien species	Federally regulated
2016	European cherry fruit fly ( <i>Rhagoletis cerasi</i> )	Yes
2018	Box tree moth ( <i>Cydalima perspectalis</i> )	Yes
2019	Japanese stiltgrass ( <i>Microstegium vimineum</i> )	Yes
2020	Strawberry blossom weevil ( <i>Anthonomus rubi</i> )	No
2021	Carnation tortrix ( <i>Cacoecimorpha pronubana</i> Hubner)	Yes
2023	Oak wilt fungus ( <i>Bretziella fagacearum</i> )	Yes

**Note:** The list does not include invasive alien species that were established in Canada prior to 2012. Species are considered "established" when a reproducing population exists in Canada and any eradication efforts have been abandoned.

**Source:** Canadian Food Inspection Agency, Environment and Climate Change Canada, and Fisheries and Oceans Canada (2024).

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