

# Terrestrial Invasive Species: in a changing climate

Terrestrial invasive species are non-native species that move into ecosystems and take over, disrupt food webs, degrade habitat, introduce parasites and disease, and can lead to species at risk.<sup>1</sup> They spread due to a lack of natural predators and few competitors for food, water and nutrients in their new environments.<sup>2</sup>

## Climate Change in Ontario

Between 1948 and 2008, the average annual temperature in Ontario increased by  $1.4^{\circ}\text{C}$ , and scientists project that by 2050 the average annual temperature in Ontario could increase by  $2.5^{\circ}\text{C}$  to  $3.7^{\circ}\text{C}$ .<sup>3</sup> Precipitation is also expected to change, with more precipitation falling in the winter than in the summer, less annual snowfall, and an increase in extreme precipitation events.

Changes in water and air temperature can make conditions more favorable for diseases and invasive species in the province. This can increase the rate that new invasive species enter the province, and allow those invasive species that are already established to spread to new areas.<sup>2</sup>

## Why should we worry about Terrestrial Invasive Species?

- Over 90% of Canada's 448 invasive plant species are found in Ontario;<sup>4</sup>
- The ecological effects of invasive species are often irreversible and, once established, they are extremely difficult and costly to control and eradicate;<sup>5</sup>
- Invasive insects and disease can eliminate entire tree species;<sup>4</sup> and
- Some invasive micro-organisms that can cause illnesses, like Lyme disease and West Nile Virus, in humans.<sup>6</sup>

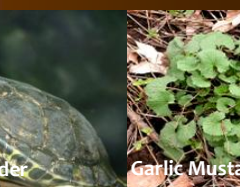
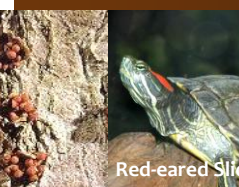
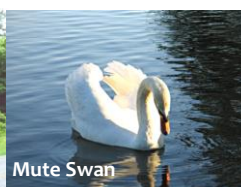
## How do invasive species enter and spread across Ontario?

- In luggage when we travel;
- Through packaging material imported into Ontario;
- With the transport of raw wood and other forest products;
- With the transport of animal carcasses or products made from them;
- When moving or transporting topsoil;
- Through gardening and landscaping; and
- From All Terrain Vehicles (ATVs).<sup>2</sup>



## Quick Facts on some of Ontario's Terrestrial Invasive Species:

- **Beech Bark Disease** results from the combined action of the beech scale insect and a pathogenic fungus, *Nectria coccinea*;
- The **Asian Long-Horned Beetle** is native to Asia and attacks and kills a wide range of hardwood trees;
- The **Emerald Ash Borer** is a beetle that is native to Asia. It attacks and kills ash trees;
- Adult **Pine Shoot Beetles** bore under the bark of pine trees, construct a brood chamber, mate, and lay eggs;
- **Sirex Woodwasps**, also known as horntails, attack and kill pine trees;
- **Garlic Mustard** grows along forest edges, trails and roads, and quickly invades forests that are disturbed;
- **Giant Hogweed** shades out native plants and can cause burns to human skin;
- The **Kudzu Vine** is an aggressive invader, producing up to 30 vines from a single root system; and
- **Phragmites** (common reed) crowd out native vegetation, resulting in decreased plant biodiversity.<sup>6</sup>



# Terrestrial Invasive Species

*Terrestrial Invasive species harm biodiversity, agriculture, forestry, public health, tourism, outdoor recreation and our economy.<sup>6</sup>*

## Adaptation

Adaptation strategies for invasive species take many forms depending on the type of species and the natural and socio-economic characteristics of its current and predicted range.<sup>7</sup>

Managing natural resources using **adaptive management principles** involves learning about climate change vulnerabilities and risks of species and ecosystems, evaluating possible responses, implementing adaptation action, and revising choices with new learning over time.<sup>8</sup>

## Examples of Adaptation

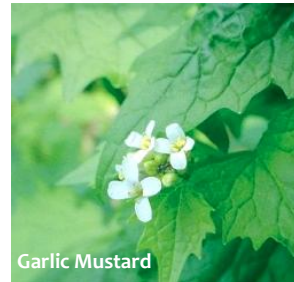
- Alter **forest management** practices in threatened areas to reduce vulnerability to forest pests;<sup>7</sup>
- Redesign **public parks and green spaces** to reduce exposure to disease vectors (e.g. mosquitoes);<sup>7</sup>
- Employ **assisted migration** techniques to maintain vulnerable native species and introduce other future climate-suitable species;<sup>9</sup>
- Establish and expand **protected areas**, reserves and natural heritage areas to link habitats and protect threatened native species;<sup>9</sup> and
- Support and develop **citizen science projects** that allow the public to get involved in monitoring for climate change.<sup>9</sup>

## Here is how you can help!

- **Gardening** - Plant native species;
- **Going camping** - Don't transport firewood;
- **Going hiking** - Clean visible mud, plants and seeds from your boots and equipment; and
- **Travelling** - Don't take plants, plant parts, seeds or fruit across borders.<sup>10</sup>



Emerald Ash Borer



Garlic Mustard



Pine Shoot Beetle

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Kudzu Vine

## Ontario Centre for Climate Impacts and Adaptation Resources

OCCAR

OCCAR specializes in communication of climate change impacts and supports adaptation planning to a wide range of stakeholders throughout the province of Ontario.

MIRARCO/Laurentian University, 935 Ramsey Lake Road, Sudbury, ON P3E 2C6

P: 705 675 1151

[www.climateontario.ca](http://www.climateontario.ca)