

Clean Equipment Protocol for Field Practitioners

The Clean Equipment Protocol for Field Practitioners is a practical, user-friendly resource designed to prevent the spread of invasive species. It answers the question: “What do I need to do right now?”

Developed for tree planting and ecological restoration practitioners, this informative resource is intended to:

- Help prevent the unintentional spread of invasive species.
- Be used as an operational standard, a decision-making tool, or a training tool to help determine when and where equipment cleaning is necessary.
- Clarify legislation/regulations and define roles and responsibilities.
- Inform about all invasive organisms - plants, invertebrates (e.g., nematodes, ants, earthworms), pathogens (e.g., bacteria, viruses, oomycetes, fungi), and more.

Safeguarding Ontario’s Ecosystems: The Legal Framework

How can you help prevent invasive species? Individuals and organizations are responsible for understanding and complying with applicable legislation. Following regulatory requirements and best management practices helps prevent the spread of invasive species and supports effective land stewardship.

1 Invasive Species Act, 2015

Regulates activities related to restricted and prohibited invasive species—including possession, transport, release, disposal, importing, breeding, buying, selling, leasing, or trading—to reduce their spread and impacts.

2 Weed Control Act

Protects agricultural and horticultural lands by requiring landowners to destroy designated noxious weeds and by prohibiting the transport of weed contaminated materials unless they are secured. This helps prevent the spread of harmful plants to weed-free land.

What are Invasive Species?

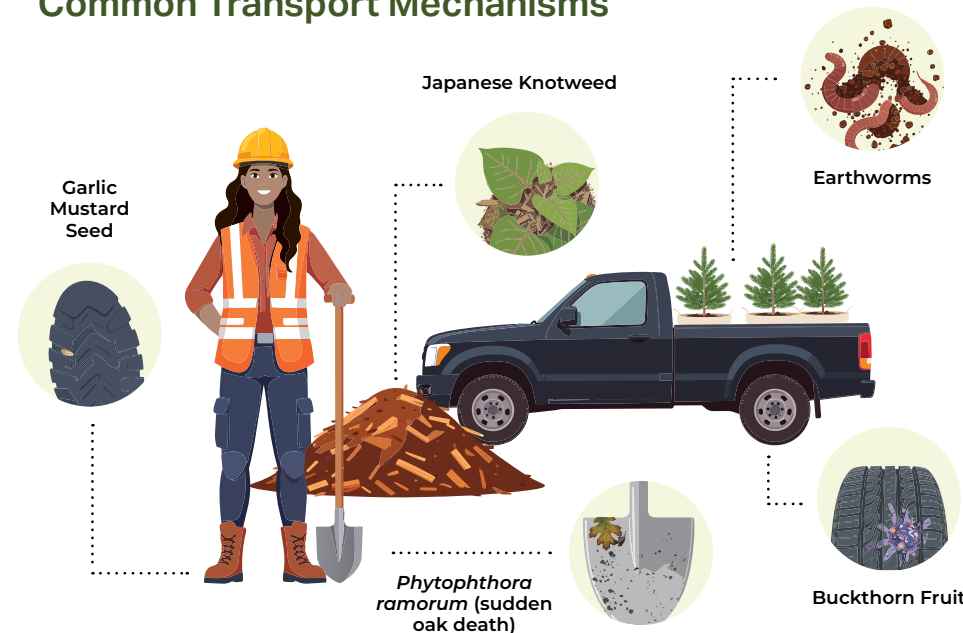
Invasive species are non-native organisms (plants, animals, insects, pathogens) that are introduced to an ecosystem outside of their native range. They have the potential to cause ecological, economic, and social harm in their new region.

Invasive species arrive accidentally and can establish quickly in the absence of natural predators or controls. They often share key traits that give them an advantage over native species. For example, invasive plants like garlic mustard can form dense, monospecific colonies by producing hundreds of thousands of seeds!

Invasive species cost Canada billions of dollars in losses to forestry, agriculture, fisheries, and other industries. Preventing the introduction and spread of invasive species is the most cost-effective management strategy. As the saying goes, an ounce of prevention is worth a pound of cure.

Did you know that seeds and rhizomes from invasive plants can travel in mud, soil, water, tire treads, undercarriages, tracks, radiators, trailer beds, and even floor mats? Soil clinging to equipment can contain viable propagules that remain dormant for years, allowing invasives to bypass natural barriers and colonize sensitive habitats like wetlands.

Common Transport Mechanisms



Why Cleaning Matters

Invasive species merit year-round attention because the activities that spread them occur in every season.

Invasive species spread through pathways, which are routes that allow organisms to move from one location to another, either naturally by wind, water, wildlife, or through human activities. A carrier is the material that contains the organism (such as soil or mud), while a vector is the physical means that moves the carrier (such as vehicles, equipment, or footwear).

Soil is an important carrier because it holds moisture and protects seeds, roots, and other organisms, helping them survive during transport to new areas. Soil can also act as habitat,

as some invasive species rely on it to complete their life cycles. Others, including plant materials and small invertebrates such as beetles, ants, nematodes, and earthworms may hitchhike in soil and spread unintentionally.

Staying vigilant by monitoring invasive species and cleaning equipment thoroughly throughout the year is therefore essential to preventing invasive species and material from being introduced into clean or restored areas.

The Workflow Cycle graphic above highlights how invasive species travel and demonstrates why cleaning equipment matters.

Case Study: Why Cleaning Equipment Matters

Cleaning equipment has shown to reduce the spread of harmful invasive plants, insects, and pathogens.

North American Invasive Species Management Association¹ 2020 found that soil and seeds collected from boot brush stations included 39 plant species, of which 14 were exotic invasives, such as garlic mustard and Japanese stiltgrass. This demonstrates that brushing boots physically removes invasive seeds that would otherwise be transported on footwear.

Hygiene treatments for boots, including brushing and disinfecting, significantly reduce the presence of the

highly invasive pathogen *Phytophthora cinnamomi* (root rot) compared to no cleaning. Effectiveness can be reduced in wet soil conditions, so extra care should be taken during sanitation procedures².

Vehicles and heavy machinery are major dispersal vectors for soil-borne pests and pathogens, enabling rapid spread across forest landscapes if clean equipment protocols are not followed. Pressure washing vehicles can remove approximately 90% of soil, helping to reduce pathogen spread on infected sites³.

¹ NAISMA. (2020, March 12). *Boot brush stations: Are they effective?* North American Invasive Species Management Association. <https://naisma.org/2020/03/12/boot-brush-stations-are-they-effective/>

² Liew, J., Phelan, N., & McDougall, K. (2023). *Effectiveness of hygiene measures in reducing Phytophthora cinnamomi spread via footwear.* Scientific Reports, 13, 32681. <https://www.nature.com/articles/s41598-023-32681-7>

³ Carlin, J., Smith, R., & Jones, T. (2025). *Vehicles as vectors of soil-borne pests and pathogens in forest landscapes.* Journal of Forestry Research, 36, 1123–1135. <https://link.springer.com/article/10.1007/s11676-025-01931-x>

What If You Find Invasive Species On-Site?

- Snap a photo and report it using EDDMapS or iNaturalist
- Notify relevant authorities if necessary
- Consult invasive species resources for best management practices
- Implement containment, mitigation, and **clean equipment protocols**
- Maintain detailed records to ensure reasonable precautions are taken to prevent invasive species spread

Reporting Invasive Species

Ministry of Natural Resources: Conservation officer oversees the *Invasive Species Act, 2015*.
 Ministry of Agriculture, Food and Agribusiness: Local municipal weed inspectors are appointed under the *Weed Control Act*.
 Canadian Food and Inspection Agency (CFIA): CFIA Inspectors enforce the *Plant Protection Act*.
 The Invading Species Hotline: 1-800-563-7711
 Conservation Ontario: (905) 895-0716