



Canadian Council
on Invasive Species

Conseil Canadien sur les
Espèces Envahissantes

Firewood Best Management Practices - Jurisdictional Scan and Analysis

Researched and prepared by
the Invasive Species Centre

March 31, 2018

ACKNOWLEDGEMENTS

Thank you to the members of the National Firewood Working Group for review and input on this report:

Canadian Food Inspection Agency
Government of British Columbia
Government of Manitoba
Invasive Species Council of British Columbia
Invasive Species Centre
Natural Resources Canada
Ontario Woodlot Association
Parks Canada
SBC Firemaster

This report was prepared by the Invasive Species Centre for the Canadian Council on Invasive Species as part of a project agreement with the Canadian Council of Forest Ministers titled “Stopping the Transport of Forest Pests through Firewood Movement”.



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TABLE OF CONTENTS

Introduction and Background.....	4
Current Regulations in Canada.....	4
Best Management Practices: Jurisdictional Scan	7
1. Harvesting Practices	7
2. Treatment.....	9
3. Sales and Purchasing	10
4. Movement.....	11
5. Storage.....	12
6. Education and Outreach.....	12
General Recommendations for Canadian Firewood Best Management Practices	13
Regional Considerations.....	13
Large Scale Producers and Vendors	14
Small Scale Producers and Vendors	14
Campgrounds	15
Consumers.....	16
Conclusions.....	17
Best Management Practices Referenced.....	18
Other Works Cited	19

Introduction and Background

The movement of firewood and other wood products through recreational and commercial pathways has contributed to the spread of invasive forest pests and pathogens in Canada. The movement of potentially infested firewood through both trade and recreational users can result in higher risk of invasive pest or pathogen spread to urban centres or natural forested areas, respectively^{20,21}. Although pest-specific regulations exist in some areas of Canada, the movement of firewood remains difficult to monitor or enforce within the country.

To address this risk and promote collaborative action among stakeholders, a Firewood Movement Working Group (FMWG) was established by the Canadian Council on Invasive Species (CCIS) in 2017. The CCIS built on recommendations from the 2017 CCIS National Firewood Taking Action Program²¹, along with the recommendations from a 2017 *Firewood Pathway Analysis for Canada*¹⁸. One of the key actions was to develop best management practices (BMP's) developed specifically for Canadian audiences. The completed BMP's should be targeted at specific user groups involved in the firewood transportation pathway, such as large- and small-scale producers and vendors, campgrounds and consumers.

While regulations and legislation exist throughout the country to restrict the spread of certain types of firewood, BMPs will provide additional tools for industries, companies, stakeholders and members of the general public to self-regulate, and further reduce the risk of spreading invasive species.

Current Regulations in Canada

Federal Regulations

Under the Plant Protection Act, the Canadian Food Inspection Agency (CFIA) strives to prevent the importation, exportation and spread of plant pests affecting the forest or agriculture sectors of Canada, to mitigate risks to Canada's plant resource base. This includes establishing pest or pathogen-specific regulated or quarantined areas in Canada where movement of certain wood materials (including firewood) beyond regulated area is restricted. **Table 1** outlines the provinces in which federal regulations for particular forest pests and pathogens exist.

The CFIA restricts the movement of firewood from areas which it regulates for specific pests, e.g., emerald ash borer. In addition, other jurisdictions are encouraged to implement their own firewood restrictions, for example, Parks Canada may restrict the movement of firewood into or out of national parks or provinces may restrict the movement of firewood into or out of provincial parks.

Moving firewood from a regulated area without a movement certificate can result in a fine of up to \$50,000.00 and/or prosecution under the Plant Protection Act¹⁶.

Table 1 CFIA regulated pests in areas within each province, as of March 2018¹⁶.

Province	Regulated Pest
British Columbia	Hemlock Woolly Adelgid
Alberta	n/a
Saskatchewan	Dutch Elm Disease
Manitoba	Emerald Ash Borer Dutch Elm Disease
Ontario	Asian Longhorned Beetle Emerald Ash Borer European Gypsy Moth Pine Shoot Beetle Dutch Elm Disease
Quebec	Emerald Ash Borer European Gypsy Moth Pine Shoot Beetle Dutch Elm Disease
New Brunswick and Prince Edward Island	European Gypsy Moth Dutch Elm Disease European Larch Canker
Nova Scotia	Brown Spruce Longhorn Beetle European Gypsy Moth Dutch Elm Disease European Larch Canker Hemlock Woolly Adelgid
Newfoundland and Labrador	n/a

Provincial Regulations

Regional regulations may also be put in place by individual provinces to provide additional regulatory power to species covered by federal regulations, and also to address species not covered by federal regulations (**Table 2**).

Table 2. Provincial regulations pertaining to firewood, adapted from the 2017 Pathway Analysis for Canada¹⁸.

Jurisdiction	Legislative Authority	Regulation / Directive	Description
CANADA	Plant Protection Act	Plant Protection Regulations / Phytosanitary Requirements for the Importation and Domestic Movement of Firewood	Domestic: Generally, the movement of firewood into National Parks and from regulated pest areas to non-regulated areas in Canada is prohibited (unless properly treated /dependent on pest-specific policies). Restrictions among National Parks vary across the country.
Yukon	Forest Resources Act	Forest Resources Regulation	Allows Forestry to control pest if necessary on any lands both private and public and First Nations; Require Timber Mark to Transport timber thru Yukon
British Columbia	Plant Protection Act (B.C.)	Balsam Woolly Adelgid Regulation	True firs grown in the quarantine zone in British Columbia cannot be shipped outside the zone within British Columbia.
Alberta	Forests Act	Timber Management Regulation and associated Directives 2011-01 and 2011-02; Agriculture Pests Act	Restricts import of coniferous logs or other coniferous forest products (incl. firewood) with bark into Alberta. Elm wood cannot be stored or transported unless en route to the closest elm wood disposal site.
Saskatchewan	The Forest Resources Management Act	Minister's Order Restricting the Import, Transportation and Storage of Pine Logs and Pine Forest Products with Bark Attached; The Dutch Elm Disease Regulations, 2005;	Restricts import of pine logs with bark (incl. firewood) into Saskatchewan from B.C., Alberta and the United States. Restricts movement, storage and use of elm wood.

Manitoba	Forest Health Protection Act	Forest Health Protection Regulation	Restricts the transport of pine wood with bark from Mountain Pine Beetle infested areas in the U.S. and Canada; restricts the transport and storage of elm wood; restricts the import of ash material from the provinces of Ontario, Quebec and numerous US states and restricts the movement of ash material from CFIA regulated areas.
Ontario	Ontario Invasive Species Act (potential)	n/a	Potential to restrict the introduction or spread of pests or their carriers (eg. Firewood).

Best Management Practices: Jurisdictional Scan

To inform the development of targeted BMPs in Canada, a jurisdictional scan of existing best management practices across North America was completed. Thirteen unique BMPs were found to provide relevant practices and recommendations that may be applied to Canada. A summary of the BMPs, their similarities and differences are broken down into six subtopics: harvesting practices, treatment, sales and purchasing, movement, storage, and education and outreach. These topics are addressed in the information below, and additional invasive species considerations have been added.

1. Harvesting Practices

Many of the BMPs contained recommendations for harvesting firewood for both large and small-scale producers, including harvest for personal use. The key included BMPs for harvesting firewood are a) tree selection, b) timing, c) record-keeping, and d) certification.

Recommended Harvesting Practices		
Practice	General Recommendations	Invasive Species Considerations
Tree Selection	<ul style="list-style-type: none"> Recommended that tree selection is planned prior to harvest⁴ and poorly formed², less desirable species¹⁰, and dying and damaged¹⁰ specimens are harvested first. 	<ul style="list-style-type: none"> Consideration should be taken on the use of dying and damaged trees as these may be infected with an invasive pest or pathogen. Dying and damaged trees may not be a safe option for the sale and transfer of firewood unless

		<p>there is access to a kiln.</p> <ul style="list-style-type: none"> The removal of dying and damaged trees may help to reduce to the spread of a potential invasive pest or pathogen within a stand if harvested during a safe time of year.
Timing	<ul style="list-style-type: none"> Trees should be harvested and left on site to season (allowed to dry) for at least one^{1,2,7,11} to two^{3,5,6,9,13} years to season. This will ensure that firewood is dry and reduce the risk that invasive species are still present. Some BMPs suggest to harvest firewood in the spring to allow it to dry and season throughout the summer, however it has also been recommended to wait to harvest until late summer to late fall to reduce the risk that pests or pathogens will spread⁵. 	<ul style="list-style-type: none"> Optimal harvest time will vary based on location and what invasive species may be present in the area.
Record-Keeping	<ul style="list-style-type: none"> Record of the origin of harvest, date of harvest, and species harvested should be kept for when firewood is sold^{2,3,12}. 	<ul style="list-style-type: none"> Important information to provide consumer to ensure firewood is kept local, and certain species are not transported beyond regulated areas. Records of origin can link to existing national and provincial regulations for consumer awareness and reference
Certification	<ul style="list-style-type: none"> Some regions, industries, or states have adopted a certification system and 	<ul style="list-style-type: none"> Proper certification will mitigate the risk of invasive species

	standard to certify that firewood is clean. This has been included in some BMPs.	spread
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2. Treatment

All of the BMPs reviewed have recommendations on the best treatment processes for harvested firewood if movement is necessary. Treatment techniques include a) seasoning, b) heat treatment, c) debarking wood, and d) grinding or chipping wood.

Recommended Treatment Practices		
Practice	General Recommendations	Invasive Species Considerations
Seasoning	<ul style="list-style-type: none"> Some of the BMPs documents recommend seasoning for at least one year^{1,2,7,11}, while others recommend seasoning for at least two years^{3,5,6,9,13}. 	<ul style="list-style-type: none"> Seasoning firewood reduces the risk that there are viable pests or pathogens existing on the wood to prevent it from spreading, however it cannot be guaranteed with seasoning alone.
Heat Treatment	<ul style="list-style-type: none"> CFIA standards specify heat treatment for firewood transport and export: <ul style="list-style-type: none"> 60°C for 60 minutes (required for U.S. Import) 56°C for 30 minutes (for domestic movement, however regulation is currently undergoing revision). Some BMP documents recommend a higher temperature for longer, however the North American standard should be used as a minimum. 	<ul style="list-style-type: none"> Effective at reducing risk of invasive species spread Kiln accessibility may be an issue for many firewood producers
Debark Wood	<ul style="list-style-type: none"> Trees, including branches should be at least 95% debarked to remove the risk 	<ul style="list-style-type: none"> Debarking is difficult for individuals or producers to do

	<p>of invasive species remaining during movement^{1,2,3,4,5,6,11,}</p> <ul style="list-style-type: none"> • Wood should be debarked and at least ½ inch below the bark also removed to ensure no pests or pathogens are present¹³. 	without the proper equipment ¹ .
Grinding or chipping wood	<ul style="list-style-type: none"> • By grinding or chipping wood to a size less than 1 square inch wood can be safe to transport^{3,5,6} 	<ul style="list-style-type: none"> • This would not be a viable option for traditional firewood but could be used as a method for pellets, landscaping mulch or other purposes. • Can be used for disposal of known or suspected infested wood

3. Sales and Purchasing

Some of the BMPs included directions for sales and purchasing techniques. These consider techniques to protect the producer/vendor, consumer, and the environment. The major recommendations include a) records and receipts, b) quality, c) volume, and d) price.

Recommended Sales and Purchasing Practices		
Practice	General Recommendations	Invasive Species Considerations
Records and Receipts	<ul style="list-style-type: none"> • Both vendors and consumers should ensure that there are proper records of the harvest and sale. • This is the responsibility of both the vendor and the consumer: consumers should not feel obligated to purchase firewood without this record. • This should include date of purchase, location of harvest, species purchased, volume purchased, price paid, vendor information, and consumer 	<ul style="list-style-type: none"> • Important information to provide consumer to ensure firewood is kept local, and certain species are not transported beyond regulated areas. • If future regulations focus on the pathway (firewood) rather than pest-specific regulations, the tree species element will be less important • Informs pathway analysis in

	information ^{2,3,5,12} .	the case of new invasive species detection.
Quality	<ul style="list-style-type: none"> • Firewood should be dry, clean, and show no signs of rot¹⁰ • Harder wood species (like oak and maple) have a higher energy content and will burn longer¹⁰. • Softer wood species (like pine and spruce) have a lower energy content and will take less time to burn¹⁰, however are the main source of firewood in some regions of the country. 	<ul style="list-style-type: none"> • Dry, clean firewood may have been seasoned and be less likely to transport an invasive species • Desired quality in hardwood vs. softwood may inform risk of species most likely to spread through firewood • If consumers expect high quality firewood at their destination, they may be more likely to buy on site than bring from home.
Volume	<ul style="list-style-type: none"> • Consumers should purchase only what they need when camping or cottaging and leave behind they do not use^{3,6,8}. • Additionally, parks and small vendors should sell firewood in conveniently sized bundles for campers and cottagers. 	<ul style="list-style-type: none"> • Consumers are more likely to purchase firewood on-site if it is provided in convenient bundles • Consider disposing unused material (especially if previously transported)
Price	<ul style="list-style-type: none"> • Not addressed in BMPs 	<ul style="list-style-type: none"> • Firewood provided locally at a reasonable price may promote purchasing on-site.

4. Movement

All of the BMPs recommended limiting the movement of firewood.

Recommended Movement Practices		
Practice	General Recommendations	Invasive Species Considerations
Movement	<ul style="list-style-type: none"> • General recommendation to limit the movement of untreated firewood to 50 miles of the point of harvest. 	<ul style="list-style-type: none"> • Less distance is preferable. • Is pest or in a few case species specific.

	<ul style="list-style-type: none"> BMP for beech bark disease recommends not moving beech further than 25 miles from the point of harvest¹¹. 	<ul style="list-style-type: none"> Movement outside of a regulated area is always restricted, independent of distance
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5. Storage

Some of the BMPs provided recommendations on how to properly store firewood. Properly storing firewood is essential to ensure that quality is high and reduce the risk of firewood being sourced elsewhere. BMPs for firewood storage include a) size, b) location.

Recommended Storage Practices		
Practice	General Recommendations	Invasive Species Considerations
Size	<ul style="list-style-type: none"> Firewood should be cut down to convenient pieces to fit in a fire ring, woodstove, or fireplace. For efficient drying, handling, and stacking firewood should be 35cm – 40 cm long and have a diameter of 7.5cm – 15cm¹⁰. 	<ul style="list-style-type: none"> Properly storing firewood is essential for firewood providers and sellers to ensure that quality product is provided. Consumers will not purchase firewood locally if only low-quality or improperly stored product is available. Note that some storage practices may increase the risk of invasive species spread – i.e., storage of infested wood
Location	<ul style="list-style-type: none"> Firewood should be stored outside of the house, off the ground, away from living trees and well-spaced from other stacks or walls^{5,10}. The firewood should then be moved into storage, not inside the house, during the winter where it can be sheltered from rain and snow¹⁰. 	

6. Education and Outreach

One of the most effective ways to prevent the spread of invasive species through the movement of firewood is for the public and industries to be educated on the associated risks.

Recommended Education and Outreach Practices		
Practice	General Recommendations	Invasive Species Considerations
Education and Outreach	<ul style="list-style-type: none"> Campaigns and common messaging can be used to raise awareness of the risks 	<ul style="list-style-type: none"> National campaign should integrate BMP's into existing messaging with a

	<ul style="list-style-type: none"> • Consumers, producers, and vendors should know the regulations for tree species, pests, and pathogens in their area^{5,11}. • Gain support from partner organizations to distribute information 	<p>consistent brand</p> <ul style="list-style-type: none"> • Link risks to recommended practices
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General Recommendations for Canadian Firewood Best Management Practices

By using the summarized best management practices above as a guide, Canadian BMPs for both large- and small-scale producers and vendors, campgrounds, and consumers can be developed. In addition to the specific recommendations listed above, general recommendations would include the following:

- Maintain consistent practices and themes that exist in current BMP's (i.e. harvesting practices, treatment, sales and purchasing, movement, storage, and education and outreach)
- BMP's should be informative and focused, keeping target audience in mind. Therefore, separate BMPs should be developed for producers, campgrounds, and consumers so that they contain only the necessary information for each audience.
- Photographs or diagrams may be included to help the audience better understand the practices being described, so where applicable should be included.
- Messaging on the "why" should be included to demonstrate the importance of adhering to BMPs and preventing the spread of invasive species (i.e., impacts to economy, society, and environment).
- References to general BMPs (i.e, storage) should be included to ensure high-quality firewood is produced. The implementation of both general firewood BMPs and invasive species-specific BMPs should produce high quality, safe, and clean firewood for consumer use.
- Additional resources should be listed or referenced in the BMP, such as government websites, Firewood Scout, Don't Move Firewood, Forest Invasives, and CCIS websites should be included.
- Users should be directed to regional specific regulation or species information, i.e., 'know the regulations in your area', rather than including all regulations in a Canada-wide BMP

- Incorporate BMP advice into ongoing communications strategies and outreach products.

A breakdown of the recommended inclusions regionally and for each audience type can be found below.

1. Regional Considerations

Regional considerations may be necessary when creating BMPs for Canada as there are federally and provincially regulated pests, quarantine zones, and threats that vary across the country. Many BMPs tend to be generic and only include high level recommendations. The following regional considerations may be addressed:

- Recommend knowing applicable legislation and regulations and provide direction to find out more information about specific pests and pathogens (both at origin and destination of intended travel).
- Consider including regional specific information on certain BMP's, such as known host trees, when trees can be harvested safely, and other species-specific considerations for harvesting, treating, or using firewood.

2. Large Scale Producers and Vendors

When developing BMPs for large-scale producers and vendors focus should be on harvesting, treatment, sales, and movement of firewood, including:

- Promote being an 'ecofriendly champion' and leader in the industry to large companies (such as Canadian Tire).
- Emphasis on record-keeping (harvest and sales) and timing so that trees are harvested during the safest time of year, seasoned well, and well tracked
- Recommend heat-treating (to CFIA minimum standards) using a kiln so that firewood can be shipped over long-distances safely.
- If the mill is located further than 50 miles (80 km) from the point of harvest, on site seasoning for 1-2 years should be considered, when allowed. Seasoning time will depend on specific species and other considerations.
- Provide outreach and education resources to customers on the risks of transporting firewood
- Consider incorporating labeling and packaging to provide information to consumers treatment of firewood

3. Small Scale Producers and Vendors

Small-scale producers and vendors should use very similar BMPs to large-scale producers and vendors, however more details may be required on forest management and harvesting

practices for woodlots, including:

- Small-scale producers may look for guidance on integrating BMP's for invasive species into sustainable harvesting practices for woodlots.
- Emphasis on harvest, treatment, movement, storage, and sales
- Most small-scale producers may not be able to acquire a kiln and therefore treatment should focus on seasoning wood for at least 1 to 2 years
- Recommend providing high quality product available in small bundles for local use in nearby campgrounds or backyard bonfires.
- Provide outreach and education resources to customers on the risks of transporting firewood
- Consider incorporating labeling and packaging to provide information to consumers treatment of firewood

4. Campgrounds

A campground that harvests its own wood would fall under a “small-scale producer and vendor”. BMPs for a campground should be focused on sales and purchasing, treatment, movement, storage, outreach and education.

- Focus on practices that will encourage campers to purchase firewood locally or from the campground itself.
- Ensure that firewood is desirable for purchase including ensuring that it is well seasoned and dry, stored properly, and in affordable, convenient sized bundles.
- Consider offering firewood at low or no cost to visitors (can offset by increasing entry fees to cover the costs).
- Campgrounds may consider implementing their own firewood policies (i.e., wood must be purchased on site or proof of purchase from local vendor; If wood is brought from a distance, or no proof of purchase is available, wood may be confiscated and destroyed)
- Consider providing disposal options for firewood unknowingly transported into the park or campground (firewood disposal bin for drop off, grinder/chipper, burning policy, etc.).
- Provide outreach and education resources to visitors on the risks of transporting firewood.
- Consider offering a small reward/incentive for people who demonstrate they bought locally produced wood or will buy it in the campground or park (could target younger

generation and include stickers for kids, a two or three-page activity booklet to do with the parent during the camping trip with themes showcasing invasives and the importance of trees).

5. Consumers

A BMPs document for firewood consumers should include information on purchasing, storage methods, and movement. Recommendations may include the following:

- Background information on risks associated with firewood movement.
- Tips on how to check wood dryness and quality, signs and symptoms of potentially infested firewood.
- Directions on what information should be obtained on a receipt.
- Sample questions of what to ask a vendor when purchasing firewood. Questions may address treatment method, location of harvest and species included.
- Direction on locating firewood near travel destination, such as:
 - Contacting the campground or property owner of where they are staying in advance to find out where they can purchase firewood locally or if it will be available on site.
 - Using resource such as Firewood Scout to locate firewood distributors
- Storage methods and guidelines to keep firewood dry, reduce risk of infestation of nearby trees or house materials, and reduce the risk of rot.
- Information on proper disposal of potentially contaminated firewood, such as:
- Report risk to employee at campgrounds or parks
- Burn wood completely and immediately, along with any debris or smaller pieces that have broken off during transport, and the vehicle used for transport cleaned thoroughly⁹.
- Grind or chip wood
- Utilize a firewood disposal bin if available
- Incorporate information into education and outreach resources, lesson plans, and campaigns to target a range of audiences

The BMPs in this analysis did not include information on **gathering firewood**, but this can be considered for a Canadian firewood consumer BMP.

- Many Canadians opt to purchase fuelwood permits through their provincial ministry

- to collect firewood (often standing or fallen dead wood or past harvest scraps/tops only).
- Recommendations may include information on choosing the right wood, timing of gather, and a maximum distance from home in which to search

Conclusions

The development of BMPs for large- and small-scale producers and vendors, campgrounds, and consumers will allow for better self-regulation of firewood movement to mitigate further spread of invasive pests and pathogens in Canada. Audience specific BMPs including pertinent information, diagrams, and images, will be valuable reference for all users along the pathway of firewood transport. This document should be used as a guide in the development of these new BMPs.

Existing BMPs in North America provide a good starting point for the development of Canada-specific BMPs but more research may be required. Consultation with each audience group may reveal additional information to include.

When BMPs are created, a distribution and communication plan should be developed to integrate into the CCIS National Firewood Communications Strategy to reach target audiences. In addition, BMPs can inform the development of outreach and education resources and materials, be integrated into lesson plans for educators, and contribute to desired behaviour change initiatives nation-wide. The incorporation of these elements into consistent messaging will help to change practices of users involved in the movement of firewood and help to reduce the risk of invasive pests and pathogens across the country.

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