

# WOOD BORERS



## State Forester Forum

### Introduction

Wood borers are a diverse group of insects that bore into trees and shrubs, and complete their development either under the bark, or inside the sapwood or heartwood. The total number of species is very large, but this *Forester Forum* will be limited to those that occur in Idaho. Several invasive species which have not been found in Idaho will also be mentioned. People should be aware of them because there is potential for introduction.

Wood borers can be classified into several different groups: wood boring beetles, ambrosia beetles, moths, and horntail wasps (Figure 1). Most hardwoods and conifer species (both trees and shrubs) have wood borers that can affect them.

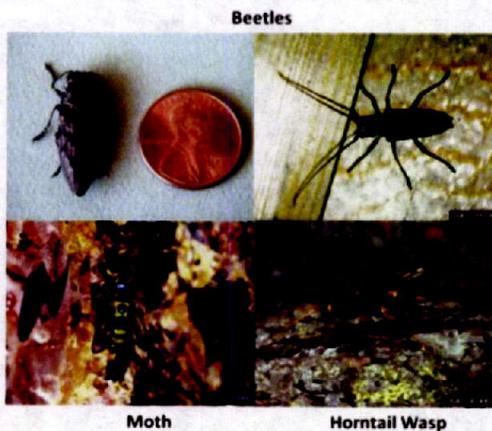


Figure 1. Representative examples of adult borers: beetles (top), moths (lower left), and wasps (lower right). Photos from Idaho Department of Lands and [www.forestryimages.org](http://www.forestryimages.org).

Wood borers act as recyclers of organic material (cellulose), and in the forest they are important in helping to break down the wood from dead trees after a disturbance such as a fire or bark beetle outbreak. With few exceptions, borers usually attack trees that are either dead, or under some form of stress. Trees that have been defoliated by insects, trees weakened by root disease or drought, or trees that are planted off-site (where they don't normally occur) are especially susceptible to attack by wood borers. Logs that are stacked in log deck in the woods or at a lumber mill may also be infested.

Wood borers can have a serious effect on the value of wood products because their feeding causes defects in the wood. Wood borers are also commonly encountered inside firewood. This is the method by which many species of wood borers (especially the invasive species) are moved to new areas.

### Biology

Because of the large number of species and different types of insects that act as wood borers, only a generalized life cycle will be presented here. Important aspects of the individual borers will be presented in the next section. All of the species discussed here have four life stages and go through complete metamorphosis. The first stage is the **egg** stage that the female will lay on suitable hosts. Some borers will chew an egg niche in the bark, and deposit eggs there. The eggs hatch and **larvae** emerge, usually tunneling under the bark, and most eventually burrow into the wood. The larvae

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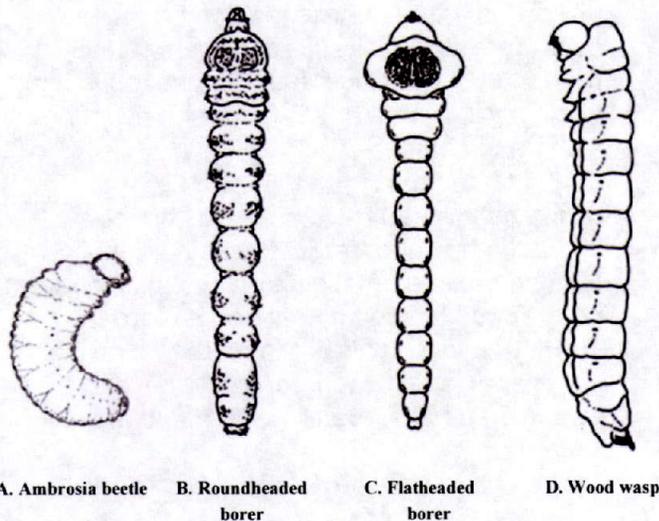
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will molt several times, into what are called instars, or larval stages. The larval stage can last for a few months to several years depending on the species. After the last larval molt, the insect enters what is called the **pupal** or resting stage. Pupae do not feed, and are often present in the winter. The final stage is the **adult** stage. Adults will mate and start the cycle over again. Adults are either non-feeding, or will feed incidentally on foliage without causing damage.

The most damaging stage is usually the larval



A. Ambrosia beetle    B. Roundheaded borer    C. Flatheaded borer    D. Wood wasp

Figure 2. Larvae of representative wood boring insects. Figure from U.S. Forest Service.

stage, and this is the stage that is often seen inside firewood or logs (Figure 2). Ambrosia beetles are the exception, where adults are the damaging stage.

## Examples of Common Wood Borers

The most commonly encountered wood borers belong to one of two beetle families. These borers have different names for the larvae and adults. The first group is the **longhorned beetles**, because the adults have long antennae (family Cerambycidae). This group is a large family of beetles found throughout North America. Larvae are called roundheaded borers because the first three segments behind the head are round and not flat

(Figures 2b & 4). The second common group is called **metallic wood borers** (family Buprestidae) because of the coloration of the adults. Larvae of this family are called flatheaded borers because the first three segments behind the head are often radically flattened giving them a "horseshoe nail" appearance (Figures 2c & 5).

**Horntail wasps** or wood wasps are another group of wood borers that occur in Idaho. Female adults are large non-stinging wasps with a large stinger-like ovipositor (egg laying organ). Males look similar, except without the ovipositor. Adult horntails are often bluish or metallic with smoky colored wings. Adults are attracted to recently killed trees, especially after fires. Eggs are deposited under the bark and the larvae can take several years to fully develop. Larvae are yellowish-white and have a small spine at the posterior end. When lumber is not kiln dried, larvae can continue to feed and form extensive galleries in the sapwood, causing a serious degrade in logs and finished lumber (Figures 2d & 6).

Another common group of wood borers are the **ambrosia beetles**. These insects are small (approximately 1/8" long) beetles related to bark beetles. These beetles are interesting because they do not feed on the wood, rather they introduce a fungus that grows in the galleries that they



Figure 3. Large pitch mass on lodgepole pine, evidence of sequoia pitch mass attack. Photo by Idaho Department of Lands.

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## MAJOR GROUPS OF WOOD BORING INSECTS IN IDAHO



Figure 4. Longhorned beetle adult (left), larva (center), and frass (right). Photos by Idaho Department of Lands (L), others by S. Kegley, USFS



Figure 5. Metallic wood boring beetle adult (left), larva (center), and gallery with frass (right). Photos by Idaho Department of Lands



Figure 6. Horntail or wood wasp adult (left), larva (center), and damage (right). Photos by W. Cranshaw (L), E. Holsten (C), and G. Csoka (R) [www.forestryimages.org](http://www.forestryimages.org)



Figure 7. Ambrosia beetle adult (left), damage in sapwood (center), and frass around base of tree (right). Photo (L) by S. Valley [www.forestryimages.org](http://www.forestryimages.org), (C) by Idaho Department of Lands, (R) by S. Kegley, USFS

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excavate inside the wood. The larvae then feed on the fungus. The beetles dig galleries inside the sapwood of dead, or downed wood or decked logs. These excavations can cause a defect in any boards made from the logs (Figure 7). Ambrosia beetles rarely attack healthy trees.

**Clearwinged borers** such as the sequoia pitch moth, commonly attack lodgepole and ponderosa pine in Idaho. This insect creates large masses of pitch that form in response to larval feeding. (Figure 3). Larvae feed beneath the bark of pines near wounds, pruning scars, branch collars or near the root collar. Larvae are approximately 1" long and are usually found just beneath the bark under the mass of pitch. The pitch masses can be confused with pitch tubes of bark beetles, but are much larger and contain more pitch.

## Damage

It is important to remember that wood borers rarely attack healthy, living trees and most damage occurs in weakened or dead trees, or in log decks. In the natural environment wood borers are important recyclers of nutrients. In unmanaged forests, there is little concern for the damage that wood borers cause. Where forests are managed for lumber, the damage becomes more important. The mining under the bark and in the sapwood can cause a serious degrade in lumber, and infested logs are usually identified during the scaling process. There may be deductions in value of either the log during scaling, or of the boards during manufacture.

The primary damage caused by wood boring insects is the physical damage caused by the breaking of fibers and making holes in the finished board. Wood borers also transmit wood staining and decaying fungi in a manner similar to bark beetles. Adult borers infect the logs with fungal spores during the egg laying process. Fungi transmitted by wood borers primarily affect the sapwood. This sapwood decay can have an impact on the value of the logs by reducing the size of the scaling cylinder, and staining decreases the value of the logs at the mill.

## Management

Most wood borer damage can be avoided. When logs are harvested during salvage operations, some borer damage can be expected depending on how long the dead or dying trees have been standing. In some cases, wood borers can attack trees killed by fire while there is still smoke in the area.

Since wood borers are a natural part of the ecosystem, and are always found in the woods, freshly felled trees and log decks can be especially attractive to borers. This is most important during the spring and summer when insects are actively flying. Wood borers are attracted to the host compounds of the trees (terpenes and other compounds in tree sap). It is important not to allow log decks to remain in the woods any longer than necessary. If logs are transported to the mill and then promptly processed, little damage is likely to occur before processing. Mill operators commonly run



Figure 8. Log deck being watered during the summer months. Photo by Idaho Department of Lands.

sprinklers on the tops of log decks or submerge logs in water during the summer months (Figure 8). The water prevents the logs from drying and checking, but it also stops wood borers from laying eggs on the logs. However, this treatment will not prevent the development of eggs that

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already have been laid.

It is always best to process logs in the order that they were received (first in, first out), but this is not always possible. Logs that are harvested in the winter are not usually treated with water at the mill. The time period in spring before log decks are normally watered provides an opportunity for early emerging wood borers (such as ambrosia beetles) to infest logs. An effort must be made to minimize the amount of time that logs are stored.

## Invasive Species

The preceding wood boring insects are all species that are native to Idaho. There are several species of wood borers that have been introduced into other parts of North America that pose a threat to Idaho. With the increase in world trade, and the

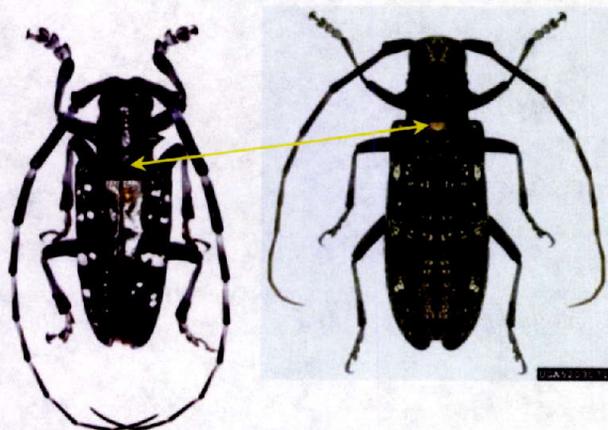


Figure 9. Asian longhorn beetle adult (L). Whitespotted sawyer (R). The Asian longhorn beetle is invasive, and the Whitespotted sawyer is native. Arrow points to base of elytra. Photo (L) by D. Haugen, (R) by N. Wright [www.forestryimages.org](http://www.forestryimages.org).

fact that Idaho has an inland port in Lewiston, the introduction of non native (invasive) species is a real threat. Two species of wood borers that have caused extensive damage to eastern forests are the Asian longhorn borer and the emerald ash borer. The Asian longhorn borer (*Anoplophora glabripennis* Figure 9) is a large beetle native to China and Asia that was first discovered in the United States in the mid 1990s The first

discoveries were in Chicago and New York City, and more recently it has been found in New Jersey, Massachusetts and Ohio. The infestations in New Jersey and Chicago have been declared eradicated. This species prefers maple trees, and has been found in Norway maple, which is very



Figure 10. Emerald ash borer adult, a serious invasive pest of native ash trees in North America. Photo by H. Russell. [www.forestryimages.org](http://www.forestryimages.org).

common in Idaho urban forests. The Asian longhorned beetle can cause severe damage to landscape trees. The whitespotted sawyer is a native borer that can sometimes be confused with the Asian longhorned beetle. The whitespotted sawyer has a white spot at the base of the elytra (hard wing covers) behind the head. The Asian longhorned beetle is black at the same place (Figure 9).

The emerald ash borer (*Agrilus planipennis*) is a metallic wood boring beetle that is also native to Asia, and it was first observed North America in 2002 (Figure 10). Since its initial introduction into Michigan and adjacent Canada, it has increased its range into 17 eastern states and Ontario and Quebec in Canada. This species attacks all species of ash (*Fraxinus* species), and is spreading through native forests where ash is present. Green and white ash are common street and ornamental species in Idaho, though the threat to native forests is minimal.

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Figure 11. *Female Sirex noctilio*, an invasive horntail introduced to eastern North America. It has not been found in Idaho, but looks very similar to native species. Photo by G. Csoka [www.forestryimages.org](http://www.forestryimages.org).

The Sirex wood wasp, (*Sirex noctilio*), is a horntail species that was introduced into six US states and Canada in eastern North America (Figure 11). This species attacks pines and other conifers and could pose a greater threat to Idaho's forests. Where it has been introduced, damage has been greatest on introduced pines such as Scots pine and Austrian pine. The Sirex wood wasp is native to Eurasia and northern Africa, and it readily attacks North American pines (Monterey and loblolly pines) grown in other countries for wood and fiber. This species closely resembles native wood wasps, identification is difficult, and requires the use of specialized identification keys.

All of the above invasive species were probably introduced into North America through solid wood packing materials (wood pallets and crates). Since their introduction, new rules have been enacted that require wood packing materials to be heat treated. These species (and other wood infesting insects) are commonly transported from place to place through the movement of firewood.

The walnut twig beetle (*Pityophthorus juglandis*) is a bark beetle native to Arizona and Mexico that can attack black walnut ornamentals. This bark beetle transmits a fungus that is lethal to black walnut trees (thousand cankers disease). This

bark beetle and disease are found throughout the West, and are now common in Idaho. Infestations have been found in the Boise area, Lewiston and Orofino. This beetle and disease have also been discovered in Tennessee, Virginia, North Carolina, and Pennsylvania where black walnut is a native species. Movement of black walnut wood, either for wood working or firewood is the most likely reason that this insect has spread so far.

## Movement of Firewood

At present there are no laws regulating the movement of native firewood species within Idaho. Movement of firewood across state lines may be regulated, is discouraged and may be

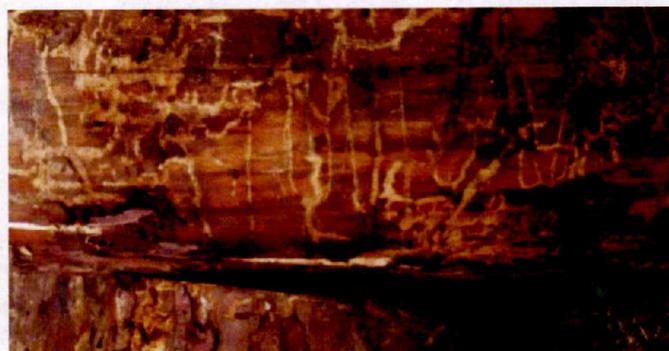


Figure 12. Western larch firewood showing evidence of flatheaded wood borer infestation. Photo by Idaho Department of Lands.

illegal. It is good practice to move firewood as short a distance as possible. Campers are encouraged to buy and burn firewood locally. Firewood may contain wood boring beetles and other insects (Figure 12).

If firewood is collected from an area that is infested with bark beetles, unwanted insects may be transported to uninfested areas. Firewood with its bark intact is likely to contain bark beetles or wood borers. The Idaho Department of Lands is cooperating with several other western states in a program to inform residents of the consequences of moving firewood long distances. You may have seen billboards encouraging people to "Buy It Where You Burn It" (Figure 13).

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Figure 13. "Don't Move Firewood" public service campaign billboard.

## Useful Links

[USFS Region 1 Field Guide](#)

[USFS Region 1 Management Guide](#)

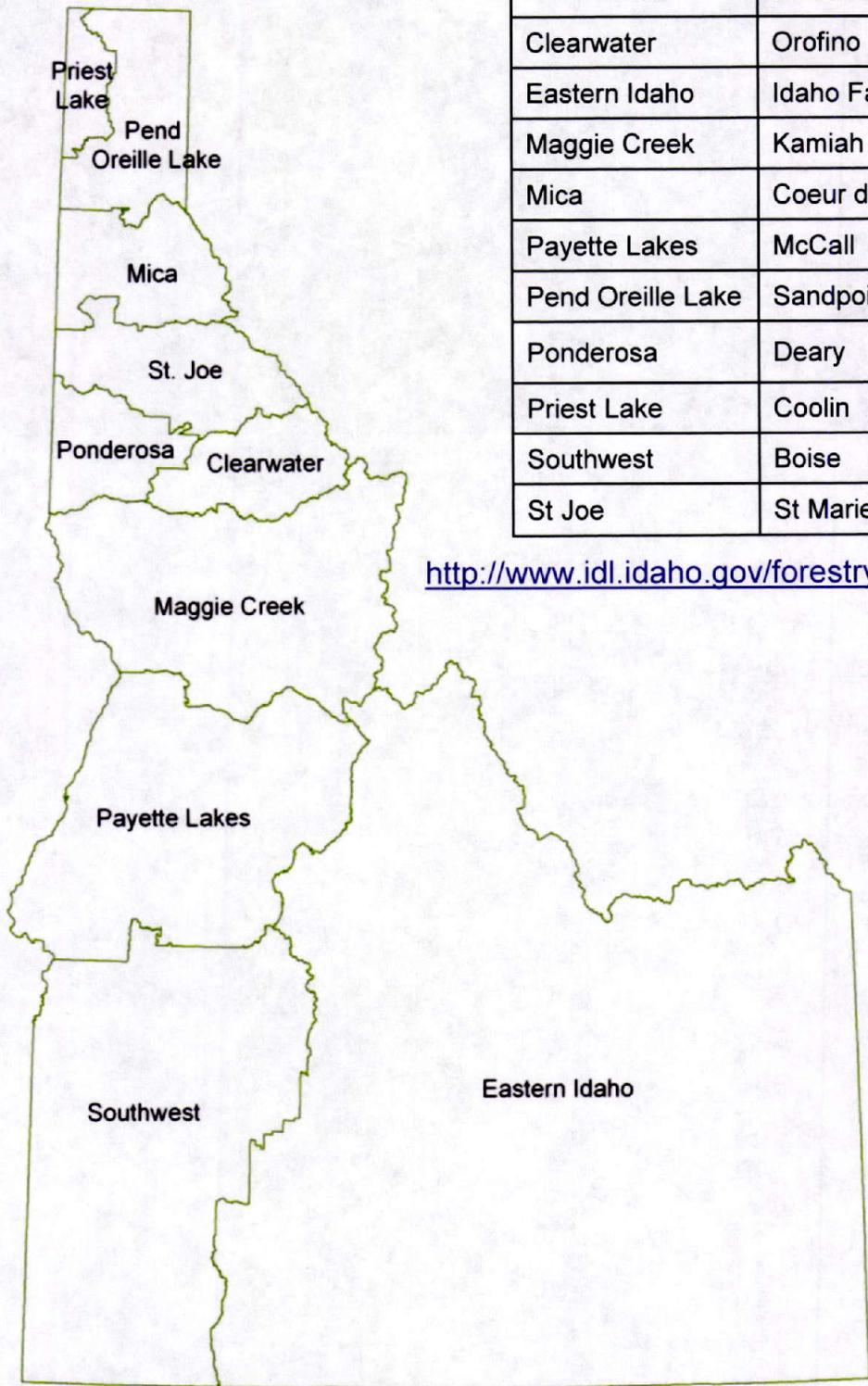
[Idaho Don't Move Firewood Campaign](#)

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Eastern Idaho	Idaho Falls	(208) 525-7167
Maggie Creek	Kamiah	(208) 935-2141
Mica	Coeur d'Alene	(208) 769-1577
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Ponderosa	Deary	(208) 877-1121
Priest Lake	Coolin	(208) 443-2516
Southwest	Boise	(208) 334-3488
St Joe	St Maries	(208) 245-4551

<http://www.idl.idaho.gov/forestry/forest-health/index.html>