

Non-Native Invasive Species in the Border Lakes Region



IDENTIFICATION GUIDE





Photo credits:

Front Cover

- Kawnipi Lake sunset – Jack Greenlee USDA Forest Service
- Common tansy – Jack Greenlee USDA Forest Service
- Emerald ash borer – David Cappaert
- Spotted knapweed – Linda Wilson University of Idaho

Back Cover

- Palisades – Jack Greenlee USDA Forest Service

NON-NATIVE INVASIVE SPECIES IN THE BORDER LAKES REGION

DATE	LOCATION (if BWCAW campsite, include the number painted on campsite latrine and the lake name)	TYPE NNIS SPECIES FOUND	COMMENTS/OBSERVATIONS (e.g. size of infestation)

PLEASE DETACH & DROP IN MAIL WITH FINDINGS
THANK YOU FOR VOLUNTEERING TO HELP COMBAT NNIS!

Why should I care about Non-Native Invasive Species (NNIS) in the Border Lakes Region?

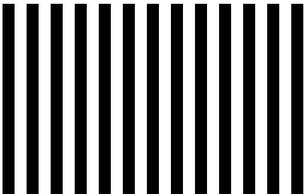
- If left unchecked, invasive species will limit many uses of our lands and waters.
- Invasive species can harm the natural heritage of our wetlands, forests, lakes and rivers.
- Invasive species can limit our opportunities for hunting, fishing, camping, wildflower viewing, bird watching, boating, and other recreational pursuits.
- Invasive species can damage the ecological integrity of the region by transforming fish and wildlife habitat.
- The longer we ignore non-native invasive species, the more difficult and expensive they will be to eradicate.
- You can be a part of the solution by being aware of invasive plants and animals and taking action to prevent their spread.

What are Non-Native Invasive Species?

NNIS are species that are not indigenous to an area and that cause harmful effects to its economy, the environment, or human health. Not all non-native species are invasive – for example, most common garden plants are attractive, do not spread aggressively, and do no harm. Just a fraction of non-native species are invasive, but those that are tend to be aggressive and difficult to control. They reproduce rapidly and cause major changes to areas where they become established.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST-CLASS PERMIT NO. 25304 MINNEAPOLIS, MN

POSTAGE WILL BE PAID BY ADDRESSEE

FRIENDS OF THE BOUNDARY WATERS WILDERNESS

401 N THIRD STREET, SUITE 290

MINNEAPOLIS MN 55401-9714



NNIS can be plants or animals, and they can be aquatic or terrestrial. Examples of non-native invasive plants that have been found on the Superior National Forest are common buckthorn, Canada thistle, purple loosestrife, spotted knapweed, and leafy spurge. Examples of non-native invasive animals are gypsy moth, spiny water flea, and rusty crayfish.

Nationally, NNIS cause major environmental damage and losses totaling \$120 billion/year. Non-native invasive plants alone infest about 133 million acres across the U.S., about the size of California and New York combined.

How bad is the problem in the Border Lakes Region?

We have a unique opportunity to limit the negative economic, environmental, and social impacts caused by NNIS in the Quetico-Superior. Compared to other states or provinces, our region has relatively low levels of NNIS infestation. However, this could change quickly without your help.

With the BWCAW being the most heavily visited wilderness area in the U.S., and with all the recreational opportunities that exist in the Arrowhead Region of Minnesota and in northwest Ontario, the area attracts hundreds of thousands of visitors every year from around the world. And with these visitors comes the potential for unwanted hitchhikers – such as gypsy moth or emerald ash borer hidden on/in firewood, spiny waterflea on boating equipment, or spotted knapweed on muddy vehicle tires.

Why should fishermen and boaters care about non-native species?

Voyageurs National Park, Superior National Forest (including the BWCAW) and Quetico Provincial Park have some of the most pristine lakes in the U.S. or Canada. Fishing and boating are two of the major attractions in the region, but non-native invasive species can cause a reduction in fish populations, damage fisheries, and make boating a challenge.

Spiny water flea is an example of a non-native invasive animal. It is a small, spine-covered crustacean that has the potential to disrupt aquatic food webs and impact fish populations. Spiny water fleas can reproduce much faster than other native zooplankton and may outcompete other species in some situations. Spiny water flea may also compete directly with young fish for food.

Rusty crayfish, another NNIS, may impact fish populations through the destruction of aquatic plants which provide important habitat for many fish species. Aquatic plant beds are an important part of rivers and lakes, and destruction of these plant beds can impact habitat for young fish, which depend on them for cover and as places to feed. Rusty crayfish are present in a number of lakes in the BWCAW, Quetico, and Voyageurs National Park.

Eurasian water milfoil, an invasive plant, negatively affects recreational activities, fish habitat, and native plant diversity. This aquatic invasive plant tends to grow in dense floating mats and may become entangled in boat propellers, clog water intakes, and pose a hazard to swimmers. Eurasian water milfoil also outcompetes native aquatic plants which provide important

fish habitat and plant diversity in lakes, rivers, and streams. In the winter, large populations of dead and decaying Eurasian water milfoil may contribute to reduced oxygen levels in lakes which may lead to over-winter fish kills.

Here's what you can do to help:

- Inspect your boat, trailer, and boating equipment and remove any plants and animals that are visible before leaving any water body.
- Drain water from the motor, live well, bilge, and transom wells while on land before leaving any water body.
- Dispose of unwanted bait such as minnows or worms in the trash. Never release live bait into a waterbody.
- Wash and dry your boat, tackle, downriggers, trailer, and other boating equipment to kill harmful species that you may have missed at the boat launch.

Even a small amount of plant material or animals can start a new infestation. Take precautions to protect the lakes and streams that you treasure.

Why should campers, hikers, mountain bikers, or ATVers care?

The solitude and beauty of the border lakes region are why many people come here to visit from across the country and around the world. Invasive species can significantly impact your ability to access and enjoy the outdoors. Campsites and portages can be infested by dense stands of Canada thistle, making passage a painful experience. Lakes can become dense mats of Eurasian

water milfoil, making paddling a challenge and swimming risky. Scenic beauty can also be reduced due to invasive plants. For example, orange hawkweed and oxeye daisy can form dense patches and displace native wildflowers, thus forming stands with just a few species rather than a vast assortment of wildflowers to enjoy.

Gypsy moths have been found recently in the Superior National Forest. One gypsy moth can eat up to one square foot of leaves a day. This weakens trees and destroys the natural beauty of the landscape. The weakened trees are also more susceptible to disease and pests, which may then kill them. Ecosystems can be altered if gypsy moth populations get high enough. Any area that has a gypsy moth infestation is unpleasant to visit due to the caterpillar droppings, and an area may be quarantined if gypsy moth populations are high enough, thus causing economic impacts.

Here's what you can do to help:

- Clean mud and seeds from all clothes, boots, equipment, and pets.
- Remove weed seeds, mud, and plant parts from mountain bike tires and chain, or ATV tires and undercarriage.
- Place seeds and plant parts in a bag and dispose of in a trash can.
- Do not transport firewood. Firewood should be purchased locally from an approved vendor or collected on-site according to agency regulations. Check with the appropriate agency to determine what firewood regulations apply to you.
- Learn how to identify invasive plants and animals and report any sightings to local land managers.

Why should loggers and foresters care?

Invasive plants can greatly impact the health and regeneration of forest lands. For example, garlic mustard can rapidly spread into the understory of hardwood stands, and has been shown to suppress other understory plants, which may reduce tree seedling establishment.

Japanese barberry, an invasive shrub, not only crowds out other plants, but also alters soil conditions to its benefit. Deer avoid eating this spiny shrub, which means they browse more on native trees, slowing the growth of seedlings or even killing them. Dense thickets of Japanese barberry or other invasive shrubs like Tatarian honeysuckle displace native plants and the wildlife that depend on them.

Common buckthorn and its slightly smaller relative glossy buckthorn both grow as shrubs or small trees. Originally used as ornamental shrubs, they often escape cultivation and become dominant in forest understories. Common buckthorn has thorns and can form a nearly impenetrable thicket. Both compete with native trees to slow their growth.

Most invasive plants depend on some kind of disturbance to the soil or ground cover to get established in the forest. Forest management activities, such as timber harvest or site preparation for tree planting, can create opportunities for non-native invasives to get established and spread. Invasive plants present in small numbers prior to forest management activity may explode in growth following management activity.

Non-native invasive insect pests like gypsy moth defoliate trees and stress them, causing increased mortality and decreased growth. Other non-native insects like emerald ash borer kill trees by eating through parts of the wood that transport sap.

These pests can impact timber production as well as residential trees. In some cases, an area will be quarantined and transport of commercial forest and nursery products is restricted.

Since loggers and foresters rely on the long-term supply of forest resources, it is in their best interest to ensure the healthy regeneration of forest stands to native tree species.

Here's what you can do to help:

- Learn to identify invasive plant species and watch for them. The sooner invasive plants are detected, the easier and cheaper it is to control them.
- Initiate control of invasive plant species before harvest activities take place. Invasive plant populations quickly explode after disturbance to the forest canopy and soils. Controlling invasive plants before harvest is a good way to avoid this dramatic increase.
- Clean timber harvesting equipment before it comes onto a new job site to prevent the transport of seeds of invasive species caught on tire tread and undercarriages.

Why should landowners care?

Living in the north woods is many people's dream come true. Invasive species can change that dream very quickly. Once an invasive species gets established, control and eradication can become very difficult and costly. In some parts of the U.S., the presence of non-native invasive plants has caused property values to drop.

Many people enjoy watching birds and wildlife from their homes. Non-native invasive species can degrade wildlife habitat and drive birds and wildlife to areas that are not affected by the invasive species.

Gypsy moths have the ability to severely damage trees. Over a large area, loss of trees caused by gypsy moths can lead to changes forest habitat with subsequent changes in lakes and streams, which are many of the reasons that people have moved to such areas to begin with. Highly valued residential trees can also be killed by gypsy moths or emerald ash borer.

Early detection of non-native invasive species by landowners can dramatically increase the chances for successfully controlling such species later on. By being aware of different plant and animal invaders and contacting resource managers if such species are found, landowners can protect the resources that they value such as shade trees, songbird and wildlife habitat, or scenic beauty.

Here's what you can do to help:

- Early detection and eradication are the most cost effective ways to manage non-native invasive species. You can help by taking on the responsibility of invasive species control on your property and educating neighbors.
- Consult with federal or state agencies on the best methods for invasive species control.

Why should gardeners care?

Non-native invasive plant species not only threaten our natural areas, they may invade your garden! Landscaping shrubs like Tatarian honeysuckle seed so freely into maintained landscapes that it is a continual challenge to rip them out before they take over and displace other species you lovingly planted in your garden.

These aggressive species can rapidly move from your land onto your neighbor's land. Working together with your neighbors is usually the only realistic way of managing NNIS infestations.

Just because a plant is not spreading in your own garden does not mean that the seeds from your plants are not spreading elsewhere. Purple loosestrife seeds, for instance, may wash from your yard into storm sewers and nearby waterways and germinate in moist areas like creek banks and lake shores.

Here's what you can do to help:

- Avoid using invasive species in your garden, or get rid of invasive species that might already be in your garden.
- Don't share invasive species with other gardeners.
- If you are worried that your garden will lose its luster after removing invasives, it is easy to find non-invasive or native alternatives for invasive landscape plants.

Jack Greenlee USDA Forest Service



Don't move firewood around the state - this can spread invasive insects like gypsy moth or emerald ash borer.

Non-Native Invasive Species to watch for:

Jack Greenlee USDA Forest Service



Buckthorn

(Common buckthorn—*Rhamnus cathartica*;
glossy buckthorn—*Frangula alnus*)

Both species of buckthorns are deciduous shrubs that can reach up to 25 feet in height. They have elliptical leaves and produce abundant blueberry-sized fruits that are black when ripe. Buckthorns

were introduced to North America for use in hedgerows and for wildlife habitat. Glossy buckthorn primarily invades wetlands and wet prairies but is also found in some forested areas. Common buckthorn is an invader of forested areas. Buckthorn fruits are consumed by a variety of birds and mammals, which aid in their dispersal. These shrubs form dense thickets that prevent woody seedling regeneration and may inhibit herbaceous understory growth in some areas. Common buckthorn has also been identified as an overwintering host for soybean aphids, a pest of soybean crops.

Jack Greenlee USDA Forest Service



Jack Greenlee USDA Forest Service



Purple loosestrife

(*Lythrum salicaria*)

Purple loosestrife is easily recognized by its purple to magenta, $\frac{3}{8}$ inch long flowers composed of five to six petals, and its square stems. It is four to six feet tall. This species was introduced as an ornamental from Europe, where it is a minor component of wetland vegetation. Here in North

America, purple loosestrife has escaped cultivation and is present in wetlands and other wet areas (streambanks, lakeshores, and ditches) in almost every state in the U.S. Purple loosestrife forms dense single-species stands that cause a decline in plant diversity and affect wildlife by reducing food and habitat for waterfowl and spawning grounds for fish. A single plant can produce 2.5 million seeds annually, and these seeds can be transported great distances by humans, animals, water, and wind. Fireweed is a common native plant that is often mistaken for purple loosestrife, but can be distinguished by having round stems and flowers with four petals.

Jack Greenlee USDA Forest Service



Leafy spurge

(*Euphorbia esula*)

Leafy spurge is a deep-rooted perennial that is native to Eurasia. First recorded in the U.S in 1827, it may have first arrived either as an ornamental or as a contaminant in agricultural seed. This species is an extremely aggressive invader of grasslands that can greatly diminish

the economic productivity and biological diversity of grasslands. It destroys wildlife habitat and rangeland productivity by replacing native grasses and forbs. Leafy spurge grows up to three feet tall, with inconspicuous yellow-green flowers about ½ inch in diameter. The leaves are long and narrow, and if you break off a leaf or break open a stem, you will see milky white sap that is toxic to most grazing animals. It flowers in June to July. Seeds are dispersed when the fruit capsules explode, shooting the seeds up to 15 feet away. A look-alike for this plant in northeast Minnesota is cypress spurge (*Euphorbia cyparissias*), which is sometimes used as an ornamental, but appears to share many of the invasive properties of its better known cousin leafy spurge.

Garlic mustard (*Alliaria petiolata*)

Garlic mustard, an invader of forests across the eastern U.S., is a biennial herb that was introduced from Europe in the 1860's. During its first year of growth, the plant forms a low-growing cluster of distinctive kidney-shaped leaves. It grows up to 40 inches tall in its second year, and can be recognized by its four-petaled, ⅜ inch diameter white flowers and triangular stem leaves with toothed edges. Garlic mustard plants produce copious seeds, with as many as 3,000 seeds per plant. These seeds can survive for up to 10 years in the soil, creating a lasting problem at invaded sites. Garlic mustard alters the chemistry of the soils where it grows by adding chemicals to the soil that prevent the growth of other plant species. In invaded areas, garlic mustard forms a single-species carpet on the forest floor.



Spotted knapweed (*Centaurea biebersteinii*)

Spotted knapweed is a biennial or short-lived perennial with pinkish-purple, thistle-like flowers and stem leaves that are covered with downy grayish hairs. Plants are 1-3 feet tall, with 1-1¼ inch wide flowers. It is believed to have been introduced from Europe in the 1890's as a contaminant in alfalfa or hay. Since its introduction to North America, this species has become one of the most problematic and widespread invasive plants in the western U.S. and is now spreading throughout the Midwest. Knapweed thrives in disturbed areas and spreads quickly once established. Knapweed is especially troublesome because of its ability to release toxic chemicals from its roots; these chemicals reduce growth and germination of neighboring plants.

Canada thistle (*Cirsium arvense*)



Canada thistle is an aggressive invader in grasslands, forest openings, and wetland edges, as well as a pest in pastures and agricultural fields. It grows 2-5 feet tall, with flowers ½ to ¾ inch in diameter. This species, which was introduced accidentally as a contaminant in crop seed, invades natural areas both by vegetative reproduction

through rhizomes and by seed, which can be carried very long distances by wind and water. Canada thistle competes with other plants for water and nutrients, causing reductions in plant diversity and crop yields. It is avoided by cattle and eaten infrequently by deer. Before initiating control efforts for Canada thistle, it is important to make sure you can recognize the differences between this species and native thistles, like swamp thistle (*Cirsium muticum*), which are much less aggressive.

Jack Greenlee USDA Forest Service



St. John's wort (*Hypericum perforatum*)

This species is a perennial invader of disturbed uplands, grasslands, and roadsides. It thrives in dry, shallow-soiled or rocky habitats. St. John's wort was originally introduced from Europe, and recently has gained popularity as an herbal remedy for depression. It grows up to 2 feet tall

and has yellow, $\frac{3}{8}$ inch wide flowers that appear in July. The leaves, when held up to the light, appear to "perforated" by many light-colored dots, and this is how it gets its Latin name "perforatum". In late summer and fall, the fruits and stems are reddish colored, which aids in identification.

Erin Heep USDA Forest Service



Jack Greenlee USDA Forest Service



Common tansy (*Tanacetum vulgare*)

Common tansy is a perennial in the sunflower family that grows up to five feet tall from a large, woody rootcrown. It grows primarily along roadsides and other disturbed areas in northeast Minnesota. Its compound leaves are reminiscent of a fern, and when crushed the leaves give off a distinctive medicinal odor. Common tansy's disk-shaped yellow flowers look like a button and are about $\frac{1}{2}$ inch in diameter. This invasive plant flowers in July and August. Common tansy is sometimes found in dried flower arrangements and is still sold commercially as an ornamental

Jack Greenlee USDA Forest Service



Oxeye daisy (*Leucanthemum vulgare*)

This member of the sunflower family is a perennial with showy white petals and a shallow root system. Flowers are about $1\frac{1}{2}$ inches in diameter. Oxeye daisy has been introduced intentionally as an ornamental and unintentionally as a contaminant in hay or grain seed.

This plant is native to Europe, and it has naturalized in the northeastern United States. It is an aggressive competitor and can be seen forming dense patches along most roadsides in northeastern Minnesota, but it will not thrive under shady

conditions. It is often included in wildflower seed packets, so consumers should read seed package labels carefully and avoid planting wildflower mixes with oxeye daisy.

Jack Greenlee USDA Forest Service



Orange and yellow hawkweeds

(*Hieracium auranticum*,
H. floribundum, *H. pilosella*,
and *H. piloselloides*)

Along with oxeye daisy, orange and yellow hawkweeds are the most common invasive plants in northeastern Minnesota. In June, roadsides, fields, and disturbed areas

become carpets of white, orange, and yellow as oxeye daisy and orange and yellow hawkweeds come into bloom. The hawkweeds are perennial plants with basal leaves, and some species are covered with short, stiff hairs. Their flowers are $\frac{3}{4}$ inch wide. They can spread both by creeping roots as well as by seeds that disperse by wind like dandelions. This characteristic allows them to spread easily into uninfested areas like the BWCAW. They are generally found in disturbed areas, but may also thrive in undisturbed areas that are open and sunny, such as rock outcrops that are common in the BWCAW. There are several native hawkweed species that could be confused with the non-native ones. The native hawkweeds have leafy flowering stems, while the exotic ones generally have nearly leafless flowering stems. The non-native hawkweeds originate from Europe.

Jack Greenlee USDA Forest Service



Plumeless thistle (*Carduus acanthoides*)

This biennial thistle is the spiniest thistle in Minnesota! Although it grows from a taproot and can be successfully killed by pulling, be sure to have stout leather gloves on hand because the stems have spiny wings from top to bottom. Plumeless thistle can grow up to 4 feet tall and

like other thistles, it has wind-dispersed seed that can travel long distances. The compact flowers are $\frac{1}{2}$ to 1 inch wide. This species is a particular problem in the prairie portion of Minnesota. The first populations in northeastern Minnesota were detected in 2003, and as a result of this early detection, there is still a good chance to prevent this species from becoming widespread in the Arrowhead Region.

Alison Fox University of Florida



Eurasian water milfoil (*Myriophyllum spicatum*)

Eurasian water milfoil is a submersed aquatic plant that was first discovered in Minnesota in Lake Minnetonka in 1987. It grows underwater and can be difficult to distinguish from native water milfoil species. Eurasian water milfoil typically has 12 to 21 pairs of leaflets on each leaf while the native northern water milfoil usually has

five to nine pairs of leaflets per leaf. The plants collapse when taken out of water, so the best way to count leaflets is to pick a piece of the plant and place it in a water-filled cup or dish. A single segment of stem and leaves can take root and form a new plant, so fragments clinging to boats and trailers can help spread this weed. There are only two known populations of this plant in St. Louis County, and none in Lake or Cook Counties yet, so preventing the spread of this plant is critical.



Jack Greenlee, USDA Forest Service

Exotic honeysuckles
Tatarian honeysuckle

(*Lonicera tatarica*)

Morrow's honeysuckle

(*Lonicera morrowii*)

Bell's honeysuckle

(*Lonicera x bella* – hybrid of Morrow's and Tatarian)

The three invasive honeysuckles are all deciduous shrubs that have frequently been used as ornamental plantings in landscaping. They range in height from five to 12 feet, and older plants have shaggy grey bark and hollow stems. The fragrant, ½ to ¾ inch wide flowers are pink, white, or red and turn into red or orange berries that are dispersed by birds. All of these exotic honeysuckles are larger than any of the native honeysuckle shrubs in northeast Minnesota, which typically grow no higher than three to four feet tall. The exotic honeysuckles are quite shade tolerant and will readily invade and displace native forest understory shrubs and forbs.

Jason Butcher, USDA Forest Service



Rusty crayfish

(*Orconectes rusticus*)

These invasive crayfish grow up to four inches long (excluding the claws) and are known to be present in 17 lakes on the Superior National Forest, 8 of

which border or are found in the BWCAW. Native to the Ohio River basin, the rusty crayfish are opportunistic feeders whose diet includes aquatic plants and invertebrates. They have the potential to displace native crayfish species and cause impacts to aquatic plant beds which are important habitats for many invertebrates and fish. Although crayfish identification is quite difficult, rusty crayfish can generally be identified by their large claws and by the dark, rust-colored spots on their sides.

Jeff Gunderson, Univ. of MN Sea Grant Program



Spiny waterflea

(*Bythotrephes cederstroemi*)

The spiny waterflea is a small (0.4 inch) aquatic zooplankton species that is distantly related to shrimp. Native to Europe, it appeared in Lake Superior in 1987 and is now found in several inland waterbodies in Minnesota including: Saganaga Lake in the BWCAW and Quetico, the four large lakes of Voyageurs National Park (Rainy, Kabetogama, Namakan, and Sand Point Lakes), and in

Saganagons and Sydney Lake in Quetico. Studies have shown that it can disrupt aquatic food webs, and its spines can make it unpalatable to small fish (although it could be a food source for larger fish.) When found on a fishing line, they look like bristly globs of jelly with black spots. They may spread unnoticed in bilge water or live wells, or attached to fishing lines or downriggers.



Viral hemorrhagic septicemia (VHS)

VHS is a virus that attacks fish. It is present in the Great Lakes, was discovered in Wisconsin in 2007, but it is not yet known to be in Minnesota. Fish with the disease show widespread

bleeding on the body surface and internal organs. Infected fish will often be listless, swim in circles, or swim just below the water's surface. The disease has caused fish kills in some of the Great Lakes. To help prevent the spread of VHS, anglers should not move any live fish or water between water bodies. This includes all gamefish, bait minnows and bait minnow bucket water, live well water, and bilge water from fishing boats.

Zebra mussel (*Dreissena polymorpha*)

Zebra mussels are small (fingernail sized) yellowish-brown clams that have light and dark



stripes on their shell. They are native to the Baltic and Caspian Seas in Europe but have been transported to the U.S. in ballast water of ships. Zebra mussels cause problems by attaching to the sides of boats and docks and clogging water intake pipes. They are filter feeders, taking plankton for food that young native fish rely on. By producing tens of thousands of young mussels each summer, they can cover lake bottoms. Their microscopic larvae can spread in live wells and bilge water, and, although no inland lakes in northeast Minnesota are known to be infested, boaters need to be extra vigilant to prevent the spread of these aquatic hitchhikers.



Gypsy moth (*Lymantria dispar*)

Gypsy moths are a non-native invasive insect responsible for tremendous damage to eastern forests in the U.S. every year.

The caterpillars are voracious - they eat leaves and can defoliate entire trees. Repeated defoliation can kill trees and lead to changes in the composition of forest trees, which directly affects wildlife habitat. This pest can affect the forest product industry as well as recreation, since during the summer months the caterpillars are very abundant and their droppings are everywhere. Gypsy moths are present in



northeast Minnesota near Tower and in Lake and Cook Counties, and the Forest Service, Minnesota Department of Agriculture, and Minnesota Department of Natural Resources have been cooperating on projects to slow the spread of gypsy moth. Gypsy moth caterpillars grow up to two inches long, and you'll usually find hundreds to thousands at a time. They do not make silk tents or webs.

David Cappaert



Emerald ash borer (*Agrilus planipennis*)

This exotic beetle was discovered near Detroit, Michigan, in 2002, and since then has been found in Ohio, Indiana, Illinois, and Ontario.

Native to Asia, it was probably brought to the U.S. in solid wood packing material. It exclusively attacks ash trees, which it kills by eating the tissues that transport water and nutrients. The adult beetles are metallic green and about ½ inch long, and they leave D-shaped exit holes in the tree when they bore out in the spring. This insect can spread when infested firewood is moved.



Jack Greenlee, USDA Forest Service



Earthworms

It is surprising for many people to find out that earthworms, those wriggly critters that gardeners and anglers like, are not native to most of Minnesota and

Ontario. Glaciers during the last Ice Age killed off earthworms over most of Minnesota and Ontario, and any earthworms found in the Border Lakes Region have been introduced by humans. In some types of forest, earthworms can cause large changes in the soil which lead to long-term changes in the types of plants that can grow on a site. Earthworms can be spread by anglers, so the safest practice when fishing with worms as bait is to pack out your leftover bait and bait containers.

How you can help...

- Learn how to identify the invasive species in this booklet – they may be in your backyard or neighborhood!
- Make sure that seeds are not stuck to your clothes or gear.
- Clean mud or dirt off your vehicle, ATV, pets, and boots before traveling onto public land.
- Inspect your boat, trailer, and boating equipment and remove any plants and animals that are visible before leaving any waterbody.
- Drain water from the motor, livewell, bilge, and transom wells while on land before leaving any waterbody.
- Dispose of unwanted bait in the trash – pack it out! Never release live bait into a waterbody.



Jack Greenlee USDA Forest Service

Design and printing of this brochure was made possible by a grant from REI to the Friends of the Boundary Waters Wilderness, and the brochure was developed in partnership with the Superior National Forest. Distribution is performed in partnership with Quetico Provincial Park and and Voyageurs National Park.



www.rei.com

www.friends-bwca.org

www.fs.fed.us/r9/superior

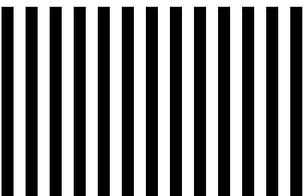


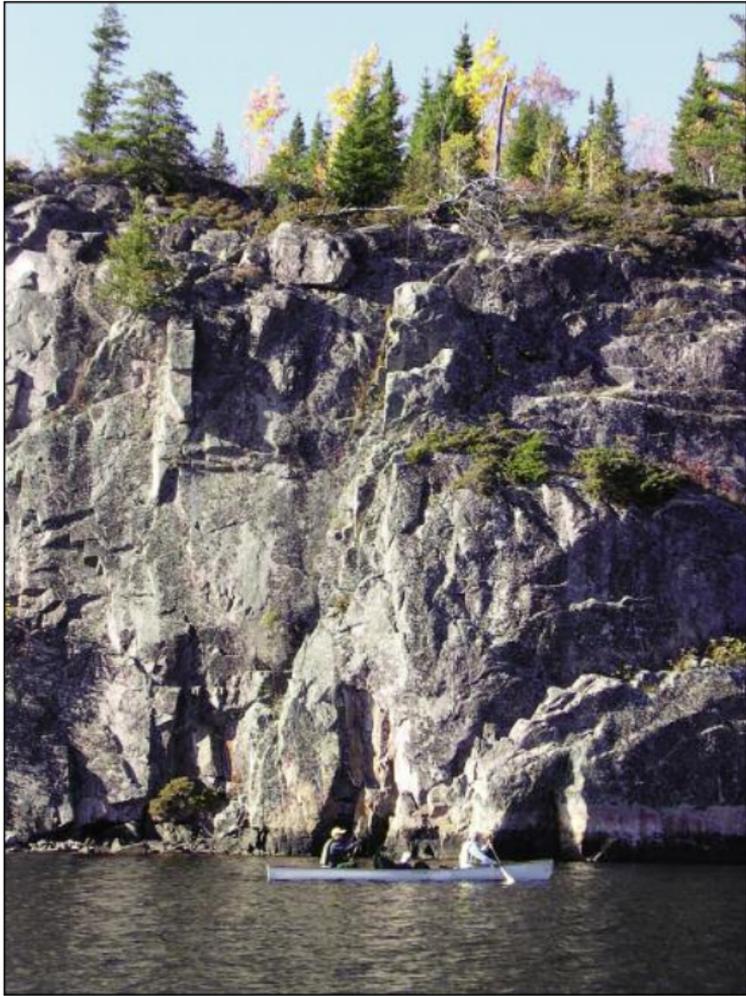
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS PERMIT NO. 25304 MINNEAPOLIS, MN

POSTAGE WILL BE PAID BY ADDRESSEE

FRIENDS OF THE BOUNDARY WATERS WILDERNESS
401 N THIRD STREET, SUITE 290
MINNEAPOLIS MN 55401-9714





TO PROTECT
A
FRIENDS
of the BOUNDARY WATERS WILDERNESS
PRESERVE

401 N THIRD STREET, SUITE 290
MINNEAPOLIS MN 55401