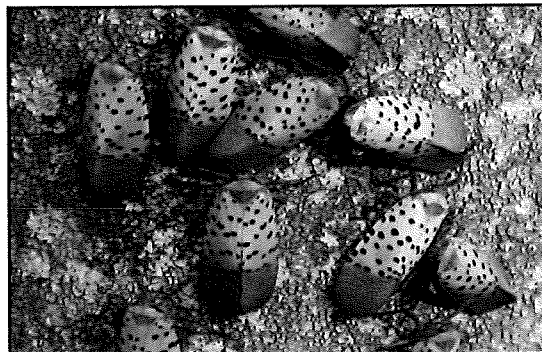




What to do if you Find the Spotted Lanternfly on your Property



The invasive spotted lanternfly has been found in southeastern counties in Pennsylvania. We are trying to eradicate this potential pest. **There is a quarantine order in place that prohibits movement of any living life stage of this insect to areas outside of the quarantine area. To find information about identifying the spotted lanternfly, current information about where it is known to exist, quarantine order, and compliance go to:**

www.agriculture.pa.gov/Protect/PlantIndustry/spotted_lanternfly

If you find a spotted lanternfly or a suspicious looking egg mass in an area **where it is not known to exist**, you should try to collect it and put it into a vial filled with alcohol to kill and preserve it, or at least take a good picture of it. Report it to the Pennsylvania Department of Agriculture (PDA) by emailing badbug@pa.gov or call the Invasive Species Hotline at 1-866-253-7189. Your discovery could add additional counties to the quarantined area.

If you find any life stage of spotted lanternfly in an area **where it is known to exist**, you should try to destroy it. This insect is considered a threat to some crops and many people are working to try to prevent it from spreading. Each female will lay up to 100 or more eggs in fall, so by destroying even one female, you are reducing the potential population for the future. To see a demonstration of destroying egg masses go to: https://www.youtube.com/watch?v=WoFp_MbDiE8.

In the late summer and fall, the spotted lanternfly prefers feeding on *Ailanthus altissima*, commonly known as the "Tree of Heaven." They can be found feeding on other plants and trees, but if you have *Ailanthus altissima*, you should start searching for spotted lanternfly on those trees. For information on how to identify *Ailanthus altissima* and how to control it, see this fact sheet: <http://plantscience.psu.edu/research/projects/vegetative-management/publications/roadside-vegetative-mangement-factsheets/3ailanthus-on-roadsides>.

The spotted lanternfly is not known to bite humans. You can kill spotted lanternflies mechanically, by swatting or crushing them. However, when you threaten them, they are able to quickly jump far away from you, so mechanical control is not easy to achieve.

People have asked if there are any natural enemies of the spotted lanternfly. Birds don't seem to like to eat them, and researchers have not yet found predatory or parasitic insects that are having a great impact on reducing the population. Over time, natural enemies often do find invasive insect species, but for now we are uncertain if this is happening on a level that is making a difference.

Many residents are asking if they can kill spotted lanternflies on their ornamental landscape trees by using a pesticide. In Pennsylvania, regulations require that a pesticide may only be used according to the directions on the label. In Pennsylvania the label must list the site (or location) where a pesticide (in this case an insecticide) may be used. There are insecticides available with labels that list ornamental trees as an allowed site. It is legal to use them on ornamentals trees, including *Ailanthus altissima*, to try to kill insects, including the spotted lanternfly. You can check at your garden center to see what they offer. Some of these products may be more effective than others, so you should take note if the product you tried worked well or not.

(continued)

Before you purchase an insecticide, there are other things to consider.

In some infested properties there are thousands of spotted lanternflies and many of them are very high up in trees. It will be difficult to reach the insects with a small can of spray or even a backpack sprayer. In this case you might consider hiring a professional tree care service to do the application.

Also, when the canopy of a tree is sprayed, the insecticide may come into contact with beneficial insects, including pollinators. People are looking for more specific methods to manage pests that reduce potential exposure of non-target organisms. This type of strategy is known as Integrated Pest Management (IPM). The PDA has been using an IPM strategy for spotted lanternfly infestations, and landowners may consider using the same IPM strategy on their properties, or hiring a professional service to do it.

IPM Strategy for the Spotted Lanternfly:

1. Locate *Ailanthus altissima* trees on the site. For reasons not understood, spotted lanternfly seem to prefer some individual *Ailanthus altissima* trees over others. Try to identify the specific *Ailanthus* trees that are most attractive to the insects, based on how many are feeding on them.
2. Destroy approximately 85% of the *Ailanthus altissima* trees, leaving only a few that are most attractive to the insect. They will serve as "trap" trees. It is recommended that you try to kill all the female *Ailanthus altissima* trees, because they produce seed and contribute to the spread of this invasive tree.

Be careful handling *Ailanthus altissima* wood, leaves, and branches. Chemicals exposure to the sap of this tree can cause headaches, nausea, and possible heart problems. Wear gloves and protect yourself from exposure.

When you cut down *Ailanthus altissima* trees, they will sprout profusely from the stumps and roots and can grow back in a few years. Because they regenerate so easily, it is highly recommended that you treat the stumps with a herbicide to kill them and prevent them from sprouting new shoots.

Herbicides that are labelled for this use usually contain one of the following active ingredients: triclopyr, dicamba, imazapyr or glyphosate. Use the herbicide carefully and according to the label directions. Methods for using herbicides to kill *Ailanthus altissima* trees include foliar sprays, basal bark applications, and a method called frill application or "hack and squirt." For more information about these methods go to <https://extension.psu.edu/herbicides-and-forest-vegetation-management>. Whatever method you choose, remember that you will have dead *Ailanthus* trees which may eventually have to be removed.

3. Treat the remaining *Ailanthus altissima* trees with a systemic insecticide that will move throughout the tree. The insecticide must be applied according to the label and at the right time of year for the trees to absorb it. When spotted lanternflies feed on correctly treated trees, they will die. Systemic insecticides that are labelled to treat ornamental trees usually contain the active ingredients dinotefuran or imidacloprid. The PDA is using dinotefuran in their IPM strategy.

Treating only a few trap trees with a systemic product can reduce the amount of insecticide used in the environment and may help conserve beneficial insects.

It is important for landowners in the affected area to avoid spreading the spotted lanternfly. One good practice is to avoid parking your vehicle under trees when the adults are present. Spotted lanternflies that are living in the trees may lay eggs on the cars that are under the tree. Females will lay eggs on many objects including lawn furniture, rocks, fence posts, rusty metal, firewood, and other items. Inspect all items, including the wood from killed *Ailanthus* trees, and destroy any living spotted lanternflies or egg masses before you move them out of the area. If you must move items from inside the affected area, complete this checklist to be in compliance with the quarantine:

http://www.agriculture.pa.gov/Protect/PlantIndustry/spotted_lanternfly/Documents/SLF%20Checklist%2011-12-2014.pdf

Many sites within the infested area have high populations of spotted lanternflies. Every resident who effectively uses control measures will help to reduce the potential for this insect to spread to new territory.

Prepared by: Emelie Swackhamer, Horticulture Extension Educator, Montgomery County, December, 2017.

extension.psu.edu

Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

Where trade names appear, no discrimination is intended, and no endorsement by Penn State Extension is implied.

This publication is available in alternative media on request.



How to Eliminate or Control Spotted Lanternfly Adults:

If you find Spotted Lanternflies in a municipality where they are known to exist, you should try to kill them.

The most effective way to eliminate these insects is to disrupt their favorite food and hang-out. In late summer and fall, Spotted Lanternflies prefer feeding on *Ailanthus altissima*, commonly known as the "Tree of Heaven." They can be found feeding on other plants and trees, but *Ailanthus altissima* is their favorite host. Here's an excellent resource to help you identify the tree:

goo.gl/cNPQkS

If you have *Ailanthus* on your property: please consider reducing the number of *Ailanthus* trees, then treat remaining "trap trees" with insecticides. This is a longer-lasting solution than simply spraying insects you see.

More detail about this process can be found at the following websites:

goo.gl/4GXNVM

goo.gl/f2oyv2

If you want to kill Spotted Lanternflies without controlling *Ailanthus*:

When there are only a few insects, you can kill spotted lanternflies by swatting or crushing them. For large populations, two kinds of insecticides are widely available that will kill Spotted Lanternfly adults. **Contact insecticides** kill spotted lanternflies when the chemical contacts the insect directly. **Systemic insecticides** are absorbed by the tree and kill insects feeding on it. **ALL** insecticides must be used as directed on the label. Take the time to read the label carefully and follow the directions. This increases your safety, the safety of the environment, and the effectiveness of the insecticide.

Pennsylvania law requires that pesticide labels list the site where a pesticide (such as an insecticide) may be used. In Pennsylvania, insecticide labels do not have to specifically list the targeted insect. There are insecticides labeled for use on ornamental trees and around buildings. These products are legal to use on the sites listed in order to control Spotted Lanternflies in Pennsylvania.

Penn State Extension is currently testing to determine which insecticides are most effective in controlling adult spotted lanternflies. Preliminary results show insecticides with the active ingredients ***dinotefuran***, ***imidacloprid***, ***carbaryl***, and ***bifenthrin*** are effective at controlling the spotted lanternfly. Neem oil and insecticidal soap provided some control, but results varied, and insects sometimes took several days to die.

December 2017



Examples listed below are some of the available insecticide products containing the most effective ingredients studied (*dinotefuran, imidacloprid, carbaryl, and bifenthrin*).

EXAMPLES OF PRODUCTS CONTAINING INSECTICIDES LABELED FOR USE IN LANDSCAPES AND GARDENS:

Contact insecticides (bifenthrin, carbaryl) - apply when adult insects are present:

AVALON INSECTICIDE
 BIFEN 7.9F SELECT
 FERTI-LOME BROAD SPECTRUM INSECTICIDE
 FLEE READY-TO-USE YARD SPRAY
 HOME MD MAXIMUM DEFENSE YARD CONCENTRATE
 LESCO CROSSCHECK PLUS MULTI INSECTICIDE
 MAXXTHOR SG
 ORTHO MAX PRO
 SEVIN
 TALSTAR SELECT INSECTICIDE
 UP-STAR GOLD INSECTICIDE

Systemic insecticides (imidacloprid, dinotefuran) – most effective when applied in spring and summer, before adults build up:

BAYER ADVANCED 12 MONTH TREE & SHRUB INSECT CONTROL
 BONIDE ANNUAL TREE AND SHRUB INSECT CONTROL WITH SYSTEMAXX
 COMPARE-N-SAVE SYSTEMIC TREE & SHRUB INSECT DRENCH
 GREEN LIGHT TREE & SHRUB INSECT CONTROL WITH SAFARI
 MONTEREY ONCE A YEAR INSECT CONTROL II
 ORTHO BUG B GON YEAR-LONG TREE & SHRUB INSECT CONTROL CONCENTRATE
 SPECTRACIDE TREE & SHRUB INSECT CONTROL
 TRANSTECT 70 WSP INSECTICIDE
 VENOM INSECTICIDE
 ZYLAM LIQUID SYSTEMIC INSECTICIDE

EXAMPLES OF PRODUCTS CONTAINING INSECTICIDES FOR USE ON VEGETABLES, FRUIT, BERRIES AND GRAPES:

WHEN USING INSECTICIDES ON EDIBLE CROPS: It is especially important to follow directions for chemical application and timing from harvest as stated on the label.

AGWAY COMPLETE FRUIT TREE SPRAY
 BONIDE COMPLETE FRUIT TREE SPRAY LIQUID
 BONIDE EIGHT INSECT CONTROL FLOWER & VEGETABLE ABOVE AND BELOW SOIL INSECT GRANULES
 HI-YIELD VEGETABLE & ORNAMENTAL INSECT CONTROL GRANULES
 SEVIN
 VEGETABLE GARDEN SOIL INSECTICIDE

The products listed above are registered for use in specific settings. Read the pesticide label and follow the directions, including application rates, methods, and appropriate protective clothing and equipment.

THE LIST IS PROVIDED BASED ON CURRENT PRODUCT REGISTRATIONS. THIS IS NOT AN ENDORSEMENT OF ANY PRODUCT OR PESTICIDE PRODUCER. THIS IS NOT A COMPLETE LIST OF POSSIBLE LABELED PRODUCTS OR BRANDS.

THESE INSECTICIDES HAVE NOT ALL BEEN TESTED AGAINST SPOTTED LANTERNFLY SPECIFICALLY, AND ADDITIONAL EXPERIMENTS ARE NEEDED TO DETERMINE THEIR EFFICACY.

December 2017

National Pest Alert

Spotted Lanternfly

Lycorma delicatula (White, 1845) (Hemiptera: Fulgoroidea: Fulgonidae)

Origin and Distribution

The spotted lanternfly is an invasive sap-feeding planthopper, first discovered in the United States in Berks County, Pennsylvania in 2014. Field observations indicate that the tree of heaven, *Ailanthus altissima*, is an important host plant; however the spotted lanternfly is known to feed on a wide range of hosts including wild and cultivated grapes, stone fruits, willow, and various hardwoods. This species is thought to be native to China, and has spread to other Asian countries. In 2004, it was first detected in Korea, where its populations expanded and it became an economically important pest of grapevines and fruit trees. In Korea, it damaged plants directly by phloem feeding, but also caused indirect damage due to mold that grew on honeydew excretions deposited on the leaves and fruits of host plants. It was recorded utilizing 67 host plant species in Korea, many of which also occur in the U.S. Given the wide range of hosts it feeds upon, the spotted lanternfly poses a serious economic threat to multiple U.S. industries, including viticulture, fruit trees, ornamentals and timber.

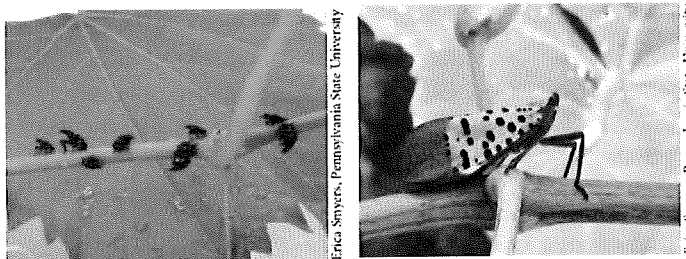
Life Cycle and Identification

The spotted lanternfly population overwinters as egg masses and has a one year life cycle. In Pennsylvania, the first nymphs hatch in late April to early May and are less than 1/4 inch long. Nymphs develop through four stages, all of which are wingless and incapable of flight. The first three nymphal stages are black with white spots and appear "tick-like." Fourth instars develop red patches on the body and are over 1/2 inch long. Adults begin to appear in mid-July and are approximately one inch long and 1/2 inch wide, with wings folded. The forewing is gray with black spots near the base, and the tips are black with a dense series of lighter gray crossveins. The hindwings are bright red at the base, and have an adjacent region that is black



Pennsylvania Department of Agriculture

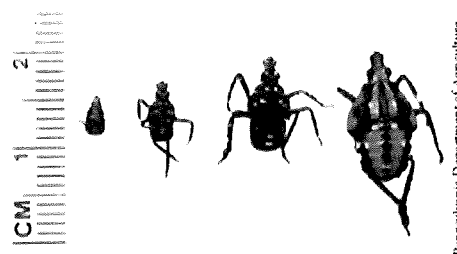
Lycorma delicatula covered by waxy deposits



Early instar nymphs (1st through 3rd) feeding on grape | Profile of adult SLP on grape

with a white band. The abdomen is yellow with black bands down the center.

Third and fourth instars and adults migrate to tree of heaven as a preferred host. Adults mate in late summer to early fall in Pennsylvania and form large congregations. Although these have been observed on grapevine, willow, maple, and other tree species, they most commonly occur on tree of heaven. Females lay eggs from late September through October and dozens of egg masses can be found near adult aggregations. Eggs are deposited on tree trunks, limbs, and loose bark as well as any smooth surface, including stone, vehicles, trash barrels, outdoor furniture, and other man-made structures. Newly laid egg masses have a gray, mud-like covering, which can become dry and cracked over time. Old egg masses appear as four to seven columns of seed-like eggs, 30-50 eggs in total, approximately one inch long.

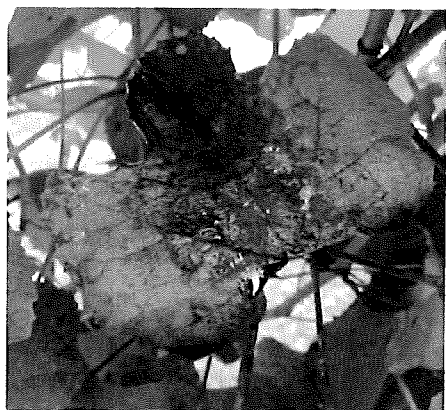


Four nymphal instars of *L. delicatula*

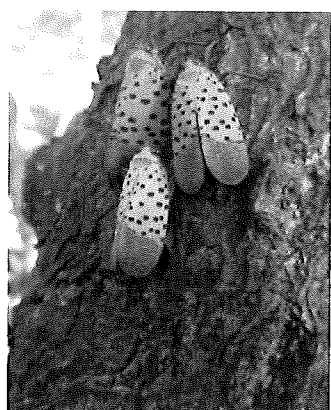
Pennsylvania Department of Agriculture

Regional IPM Centers

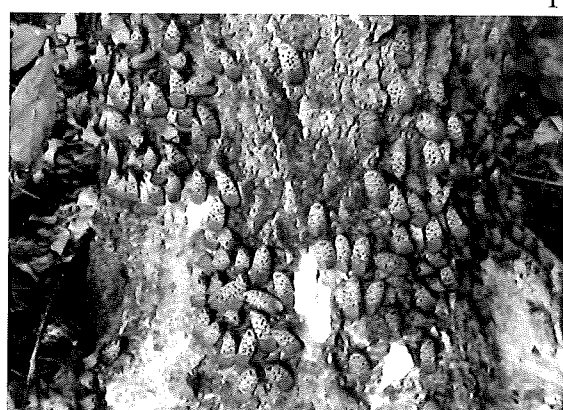
USDA United States Department of Agriculture National Institute of Food and Agriculture



Sooty mold growing on the surface of a grape leaf



Three adult spotted lanternfly



Adults aggregating/feeding on a tree of heaven

Potential Spread and Impact

Given that egg cases are deposited on such a wide variety of surfaces, this is the life stage that may have the greatest potential for spread via accidental transport to new areas. As of December 2016, the spotted lanternfly has been detected only in the southeastern region of Pennsylvania, specifically in areas surrounding Berks County.

Nymphs are flightless and may pose less of a threat for spread. However, they have been observed feeding upon over 30 species of host plants in Pennsylvania, demonstrating the spotted lanternfly is mobile and capable of dispersing to some degree as immatures. The primary host, tree of heaven, is itself an introduced invasive species that occurs throughout much of the U.S. It is considered an edge species and grows quickly in disturbed sites, including along roadways and powerline corridors. As such, corridors of tree of heaven may provide opportunities for spotted lanternfly to spread.

Although adults are capable of flight, they are relatively weak flyers, relying instead on strong jumping to evade danger. Mated females pose a high risk for establishing new populations by accidental transportation on vehicles, such as open bed trucks, and introduce their offspring to new areas. Infested municipalities are under a quarantine that covers all living life stages of the pest and its conveyances.

Trees of heaven fed upon by congregations of adults may exhibit weeping of sap along the trunk as well as build ups of honeydew excrement. Black sooty mold fungus grows on the honeydew on the tree as well as on surrounding soil and understory plants. Weeping sap and/or honeydew build ups attract ants, bees, wasps, hornets, and flies.

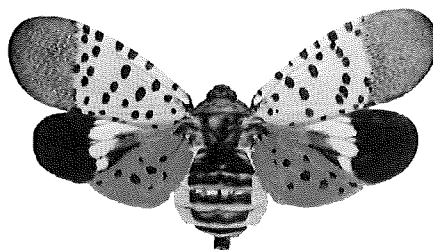
Management

Management efforts are targeted at multiple life stages of the spotted lanternfly. Egg masses can be scraped off of surfaces where they are found. Brown sticky bands are effective in catching nymphs on trees. Adults are controlled using a combination of *Ailanthus* host

reduction and establishment of trap trees treated with systemic insecticide, which has shown to be capable of removing significant numbers of adults in the population.

Reporting

Early detection is vital to the control of spotted lanternfly. If you find an insect or egg case that you suspect is a Spotted Lanternfly, you should collect it and immediately report it to authorities. Place the insect or egg case into a container of alcohol to kill and preserve it. Egg cases can also be collected into a ziplock bag and killed with hand sanitizer. It is important to record where you found the insect and include the following information for each sample collected: date; substrate found on (e.g., species of tree, or for egg case, structure it was found on); collector's name; phone number; collection location including state, county, and address or nearest intersection; GPS coordinates, if available.



Adult spotted lanternfly

Pennsylvania Department of Agriculture

To report the finding in Pennsylvania, report it to the Pennsylvania Department of Agriculture by email to: Badbug@pa.gov. Outside of Pennsylvania, call the Invasive Species Hotline: 1-866-253-7189, report to Badbug@pa.gov or contact your local Extension office.

For more information on this pest, its management and quarantine in Pennsylvania, please see agriculture.pa.gov/protect/plantindustry/spotted_lanternfly/ or ncipmc.org/action/alerts/spotted_lanternfly.php.

Authors

Julie M. Urban¹, Erica Smyers¹, Lawrence Barringer², Sven-Erik Spichiger²
¹Department of Entomology, Pennsylvania State University, University Park, PA; ²Pennsylvania Department of Agriculture, Harrisburg, PA

This publication was produced and distributed by USDA-NIFA Regional IPM Centers and the 1862 Land-Grant Universities. For more information regarding the development of this document, contact Susan T. Ratcliffe at sratclif@illinois.edu or by phone at (217) 333-9656.

Regional
IPM
Centers



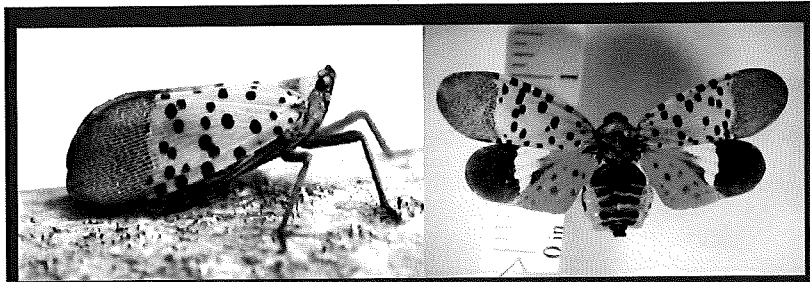
United States
Department of
Agriculture

National Institute
of Food and
Agriculture

Checklist for Residents Living in Spotted Lanternfly Quarantine Areas

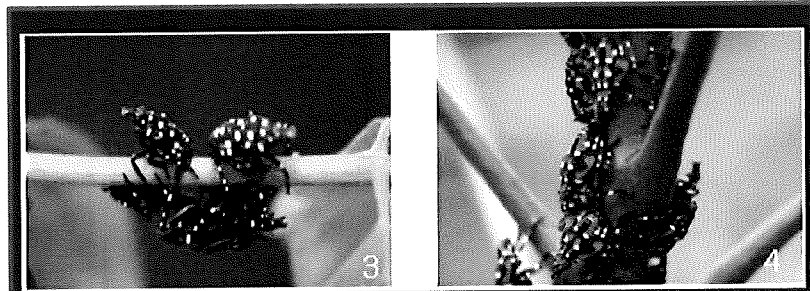
IMPORTANT: Before you move outdoor items from the quarantine area, check for spotted lanternfly egg masses, adults, and nymphs. Make sure all items are pest free before you move them. Help keep this pest from spreading.

If you find any of these life stages of the Spotted Lanternfly, remove, devitalize, place in a sealed bag, and dispose of bag in the garbage.



Adult Spotted Lanternfly, present in autumn months.

Fresh Spotted Lanternfly egg mass (outlined in red). Egg masses are present in autumn and winter months, blending in with their surroundings.



Spotted Lanternfly nymphs, present in spring and summer months. (Images from Park et al. 2009)

By signing this checklist, I am confirming that I have inspected my vehicle and those items I am moving from the Spotted Lanternfly quarantine area, and do not see any egg masses or insects in or on anything I am moving.

Signature _____ Address _____ Date _____

Please sign, date, and keep this checklist in your vehicle with you – use it each time you need it.

For more information, visit the Pennsylvania Department of Agriculture website:
www.pda.state.pa.us/spottedlanternfly

Checklist for Residents

Living in Spotted Lanternfly Quarantine Areas

IMPORTANT: Before you move outdoor items from the quarantine area, check for spotted lanternfly egg masses, adults, and nymphs. Make sure all items are pest free before you move them. Help keep this pest from spreading.

Check before you move

Recreational or Camping Items

- | | | |
|--|--|--------------------------------|
| <input type="checkbox"/> Backpacks | <input type="checkbox"/> Ice chests | <input type="checkbox"/> Tarps |
| <input type="checkbox"/> Basketball backboards | <input type="checkbox"/> Motorcycles | <input type="checkbox"/> Tents |
| <input type="checkbox"/> Bicycles | <input type="checkbox"/> Motor homes | <input type="checkbox"/> Other |
| <input type="checkbox"/> Boats/Boat trailers | <input type="checkbox"/> Recreational vehicles | |
| <input type="checkbox"/> Campers | <input type="checkbox"/> Snowmobiles | |

Outdoor Household Items

- | | | |
|--|---|---|
| <input type="checkbox"/> Barrels | <input type="checkbox"/> Propane or oil tanks | <input type="checkbox"/> Storm/Screen doors and windows |
| <input type="checkbox"/> Cardboard or wooden boxes | <input type="checkbox"/> Trash cans | <input type="checkbox"/> Window awnings |
| <input type="checkbox"/> Outdoor poles | <input type="checkbox"/> Refrigerators/Freezers | <input type="checkbox"/> Outdoor furniture |
| <input type="checkbox"/> Plant containers | <input type="checkbox"/> Storage sheds | <input type="checkbox"/> Other |
| <input type="checkbox"/> Firewood | <input type="checkbox"/> Shutters | |

Building Materials

- | | | |
|---|--|--|
| <input type="checkbox"/> Bricks/Cinder blocks | <input type="checkbox"/> Roofing materials | <input type="checkbox"/> Skidsters/Forklifts |
| <input type="checkbox"/> Cement mixing tubs | <input type="checkbox"/> Tools and toolboxes | <input type="checkbox"/> Pipes |
| <input type="checkbox"/> Lumber | <input type="checkbox"/> Workbenches | <input type="checkbox"/> Other |

Yard and Garden Items

- | | | |
|---|---|---|
| <input type="checkbox"/> Dog houses, rabbit sheds, chicken coops, etc | <input type="checkbox"/> Garden tillers | <input type="checkbox"/> Signs and posts |
| <input type="checkbox"/> Barbecue grills | <input type="checkbox"/> Yard decorations | <input type="checkbox"/> Storage sheds |
| <input type="checkbox"/> Carts | <input type="checkbox"/> Garden tools | <input type="checkbox"/> Tractors and trailers |
| <input type="checkbox"/> Cold frames | <input type="checkbox"/> Backhoes | <input type="checkbox"/> Trees, shrubs and plants |
| <input type="checkbox"/> Fencing | <input type="checkbox"/> Lawnmowers | <input type="checkbox"/> Other |

Children's Playthings

- | | | |
|---------------------------------------|---|--------------------------------|
| <input type="checkbox"/> Play houses | <input type="checkbox"/> Bicycles, scooters | <input type="checkbox"/> Other |
| <input type="checkbox"/> Kiddie pools | <input type="checkbox"/> Sandboxes | |