



# A Landowner's Guide to Controlling Bush Honeysuckle in the St. Louis Region

## Natural History and Introduction

Missouri's secondary forests are now home to two exotic invasive honeysuckles, collectively referred to as bush honeysuckle. Distinct from Missouri's native twining honeysuckles, amur and bella honeysuckle are erect shrubby plants native to eastern Asia. They were introduced into North America in the mid 1800's for wildlife cover, landscaping, and as a solution for erosion.

Bush honeysuckles leaf out early in the spring and remain green late into fall, giving them a competitive advantage over Missouri's native plants. They also compete for soil moisture and nutrients, and may produce a chemical that inhibits native plant growth. In addition, all species of bush honeysuckle spread by their roots, resulting in the ability to further dominate an area. The resulting dense understory of honeysuckle greatly inhibits seedling establishment of native plants and consequently, forest regeneration. In fact, many fear that much of Missouri's oak-hickory woodlands will be lost as a result of the honeysuckle invasion.

This document provides recommendations on developing a bush honeysuckle management plan, descriptions of various control techniques, and a listing of conservation contractors who can be hired to implement honeysuckle control practices. In addition, information is provided about cost share opportunities available to landowners interested in controlling this species on their land.



Figure 1: In the spring bush honeysuckle produces fragrant paired tubular 1-inch long flowers with narrow petals. These flowers are white or pink but become yellowish as the plant matures.



Figure 2: Red berries are produced in pairs near the origin of the leaves and generally mature in September to October.

## Developing a Management Plan

Bush honeysuckle control efforts can be labor intensive and costly. Consequently, it is recommended that you consult with a forester or biologist when developing a control program for your property. There are several methods that can be used to control bush honeysuckle, each having unique advantages and disadvantages. In most cases, a combination of multiple techniques provides the best results. In addition, a landowner should be prepared to implement follow-up monitoring and control efforts at least every two years after the initial treatment.

The initial step in developing a honeysuckle control program is conducting an inventory. Most likely, the level of infestation on your property will vary (e.g. *none, light, medium, heavy*), so it will be beneficial to take notes as to the approximate density and average size of the honeysuckle plants in the various wooded areas on the property. It may also be beneficial to take notes about the condition of the forest community (e.g. mature oak-hickory woodland with lots of native grasses and forbs). You can then use this information to split your property into multiple management units, assign priority levels and plan the most appropriate control techniques for each given unit. The best time to conduct this inventory is late October through early November, after the native plants have gone dormant. The honeysuckle will still be green at this time, allowing for easier identification from a distance and quicker evaluation of the infestation levels and extent. The inventory can also be conducted in early spring (late March – mid April), because honeysuckle breaks dormancy before most other native woody plants.

The photos below help illustrate the difference in bush honeysuckle infestation levels. They also show how well honeysuckles “show up” in the early spring or late fall. Figure 3 shows a heavy infestation of a woodland stand dominated by locust, ash, and elm making this a lower priority area in comparison to the oak hickory woodland. The low-moderate infestation level is located within a quality oak hickory woodland (Fig 4).



Figure 3: Heavy Honeysuckle Infestation: Low priority area due to undesirable species composition and advanced infestation stage. (Photo taken in April)



Figure 4: Light/Medium Honeysuckle Infestation: High priority area due to desirable hardwoods dominated by oaks and hickories. (Photo taken in October)

## Control Technique Descriptions

The following pages detail the procedures, applicability, equipment needed, and cost/acre for the various methods used for honeysuckle control.

# Cut/Stump Treatment

**Treatment timeframe:** Summer through winter, most effective during late summer before leaf drop

**Equipment needed:** Herbicide applicator (paintbrush, spray bottle, etc.), cutting tool (chainsaw, brush cutter, etc.)

**Estimated cost/acre:** \$150-300/acre

**Treatment scale:** Small to medium (one half to 5 acres), trunk diameter greater than one inch, medium to heavy infestation.

Cut/stump treatments are very effective in controlling undesirable woody plants and are more suited for larger mature plants with stems 1" or greater. This method can be time consuming in dense stands since honeysuckle is generally multi-stemmed. This method involves cutting plants close to the ground and applying herbicide to the cut surfaces, using a spray bottle, paintbrush, or other applicators. This method has many advantages over some of the other techniques, including: efficiency, accuracy, cost effectiveness, and more importantly reduced regrowth.



Figure 5: Cut/Stump treatment with EPA approved dye

Determining whether to use an oil or water soluble herbicide depends on the time of the application in relation to the cutting. Using a water soluble herbicide, the application must occur within minutes of cutting. Oil soluble herbicides extend the amount of time the herbicide can be applied, but still should be applied within a few hours of cutting. Adding an EPA approved dye to the herbicide mixture will be beneficial in tracking which plants have been treated, as well as, visually seeing herbicide coverage on the stump. Results using a triclopyr product vary and lack consistency. A glyphosate product is the recommended herbicide and will lead to greater plant death, and reduced resprouting.

Active Ingredient	Brand Names	Recommended Mixtures
Glyphosate	Roundup, Accord	20% mixed with water
2,4-D + Picloram	Pathway, Tordon	Apply undiluted
2,4-D + Triclopyr	Crossbow	4% mixed with oil carrier
Triclopyr	Remedy/Garlon 4	20% mixed with oil carrier
Imazapyr	Arsenal	8% mixed with water

Table 1: Herbicides and recommended mixtures for cut/stump treatment. Mixtures may need to be adjusted as the initial applications are assessed

## Procedure

- Begin by cutting plants near the soil surface. Top growth can be removed using pruning shears, a sharp axe, chainsaw, or a variety of other cutting tools
- Make sure stump surfaces are clear of debris
- Apply herbicide mixture to entire cut surface. Keep in mind, this is a low volume herbicide application. Only apply enough herbicide to thoroughly cover the target area
- Herbicide will take time to move throughout the plant, if you do not see new growth in the next growing season the treatment was successful

# Basal Bark Treatment

**Treatment timeframe:** Any time of year, late summer to fall is best

**Equipment needed:** Backpack or hand sprayer with an adjustable cone nozzle

**Estimated cost/acre:** Up to \$400-600/acre in dense stands

**Treatment scale:** Small to medium (one half to 5 acres), trunk diameter greater than one inch, light to medium infestation

Basal bark treatment is most useful when the target density is relatively low and when standing dead plants can be tolerated. A major advantage of this method is the selectivity that can be used resulting in little damage to surrounding vegetation. However, basal bark spraying should not be completed when spraying into standing water or snow is inevitable. Unlike other removal techniques, an oil carrier is used instead of water and only a few specific oil soluble herbicides are effective.

For basal bark treatments mix diesel fuel or horticultural oil with a triclopyr herbicide such as Remedy or Garlon 4. An EPA approved dye may be useful to track progress and avoid duplicating or missing plants.



Figure 6: Basal bark treatment showing complete coverage and EPA approved dye

## Procedure

- Using a flat spray nozzle set to low pressure spray the bottom 12-15 inches of each stem completely around the plant
  - Avoid creating a puddle of herbicide at the base of the plant
  - There is no need to spray the leaves of the plant, it is ineffective and will waste herbicide
- After treating the plants it is important to avoid cutting the plants for at least 6-8 months allowing the herbicide time for adequate absorption and translocation through the entire plant

Herbicides	Recommended Mixture
Triclopyr ester	25% with 75% horticultural oil
Pathfinder II	Pre-mixed

Table 2: Herbicides and recommended mixtures for basal bark treatment

# Backpack Foliar Spraying

**Treatment timeframe:** Late spring through late fall

**Equipment needed:** Backpack sprayer: \$100-300, ATV sprayer: \$200-400, Hand held sprayer (for smaller jobs): \$50

**Estimated cost/acre:** \$50-400/acre (varies with infestation level)

**Treatment scale:** Small to medium (one half to 5 acres), plant height less than 6 feet tall, light to medium infestation

A foliar application directs the herbicide mixture directly to the leaves of the plant and is one of the most effective techniques for removing bush honeysuckle. Foliar treatments using backpack sprayers work best in light to medium infestations, when the plants are less than 6 feet tall (Figure 4). Application is effective from early summer through late fall prior to leaf yellowing. However, spraying in late fall helps ensure that native plants are entering their dormancy period and will not be affected by the chemicals applied. It is important to wait at least 1 year to cut stems after the herbicide application allowing time for the herbicide to travel to the roots of the plants lessening the likelihood of re-sprouting.

In dense, mature stands, backpack foliar treatments may be impractical. In this situation it is often necessary to mow or shred the honeysuckle first and then utilize foliar treatments the following growing seasons on the new smaller sprouts. After mowing, it is important to wait until new sprouts get at least 1 foot tall.

Complete coverage of all foliage is necessary, but try to avoid over-application as this may reduce the overall effectiveness of the treatment. Several treatments will likely be necessary to achieve control. Avoid foliar spraying during periods of drought. In some instances larger bushes tend to lean over creeks and waterways. In these cases it is important to use the specified formulation of glyphosate (i.e. Rodeo) that can safely be used near a water source without damaging the watershed. Adding ammonium sulfate to the solution at a rate of: 17lbs/100 gallons of solution, will increase uptake into the plant and extend the efficacy of the mixture.

Herbicide	Recommended Mixtures
Glyphosate	2-3% mixed with water
Imazapyr	3% mixed with water
Triclopyr	1-2% mixed with horticultural oil

Table 3: Herbicides and recommended mixtures for foliar treatments

## Procedure

- It is advisable to walk in a grid pattern to avoid missing plants and duplicating treatments
- Spray all foliage of honeysuckle plants. Plants should not be dripping with herbicide, just slightly moist
- If desirable vegetation is sprayed, you may clip off the treated foliage to prevent uptake



Figure 7: Hand held sprayer for foliar treatments

# Mist Spraying

**Treatment timeframe:** Late fall

**Equipment needed:** Stihl SR 450 Backpack Mistblower: \$500-600

**Estimated cost/acre:** \$200-300/acre

**Treatment scale:**

Mist spraying uses wind to distribute tiny droplets of herbicide throughout the infested area. This method is most effective in moderately dense forest internal infestations where herbicide drift is not a major concern. Mist spraying can also be completed along forest edges or property lines, but only with suitable wind directions that will prevent herbicide drift. In extremely dense stands, walking at a pace that maintains proper application rates is difficult. Dense stands also limit the kill distance to 10-20 ft. and larger mature plants require the applicator to spray above the horizon. In large, dense stands it may be necessary to mow or create parallel paths through the woods using a bullhog or other forest cutter to allow access for sprayer. In more moderate stands the applicator can walk at a normal pace allowing for easier calibration and overall coverage. In moderate stands the kill distance is not reduced and can extend to 30-35 ft.



Figure 8: Backpack mistblower for mist applications

It is important to use extreme caution with wind speeds and direction during herbicide application. Maintaining a buffer area between treatment area and property boundaries reduces the chance of herbicide drift onto adjacent properties. As a precaution to non-target plants, foliar active herbicides are generally recommended.

## Procedure

- Up wind of the targeted area, begin walking at a pace that maintains proper application rate. If wind direction is not from the application site to the target stand, operations should not begin
- Flow/rate adjustment should be set between #3-5 depending on calibration and walking speed
- It's difficult to keep track where you have sprayed so walking in a grid pattern in two directions will ensure even coverage
- This treatment requires wind speeds below 12-15 mph

Herbicide	Recommended Mixture
Glyphosate	13%

Table 4: Herbicides and recommended mixtures for mist spraying

For more information regarding mist spraying please reference MDC's *Mistblower User Guide for Late Fall Honeysuckle Glyphosate Application*, which is available upon request.

# Prescribed Burning

**Treatment timeframe:** Prescribed fires will be most effective in late October (before leaves yellow) or in late March to late April (when the honeysuckle is leafing out)

**Equipment needed:** Drip torches, rakes, swatters, leaf blowers, water units, PPE, radios

**Estimated cost/acre:** If contracted, costs varies widely depending on site

**Treatment scale:**

Periodic prescribed fire can often be used to keep bush honeysuckle under control when used repeatedly. However, fires only top-kill larger honeysuckle plants and resprouting in subsequent years will likely occur. However, fire will kill smaller stemmed plants, and reduce the chances of resprouting. Repeated fires at least every 2-3 years will be necessary to keep honeysuckle at a tolerable level and prevent spreading. Fire is a good option in oak-hickory stands with light to medium infestations where sufficient leaf litter needed to carry a hot fire is present (see Figure 4). A hot fire will typically not carry through a dense mature honeysuckle stand, due to the lack fuels. In these instances it may be beneficial to complete a forest thinning. This will improve airflow and increase grass diversity which helps carry a hot fire.

Fire is very cost effective if conducted by the landowner, and is a good practice to use in conjunction with other herbicide application methods. However, prescribed burning should not be attempted without adequate training, planning and preparation. Valuable information about prescribed burning can be obtained by attending an MDC prescribed burning workshop. For more information about these workshops and prescribed burning training contact your local Private Land Conservationist (PLC).



Figure 9: Prescribed fire can not only be used for honeysuckle removal but also deposits vital nutrients back into the soil and stimulates oak regeneration



Figure 10: Adequate firebreaks are a crucial component to any prescribed fire

# Pulling

**Treatment timeframe:** Early spring while the soil is still moist (hand pulling), when soil is dry or frozen (large equipment can be used without fear of damaging soil)

**Equipment needed:** Weed wrench (Figure 11), heavy equipment with proper attachments (i.e. badger claw, etc.)

**Treatment scale:** Small (less than one half acre), trunk diameter less than one inch, light to medium infestation

Since bush honeysuckle is generally shallow rooted, small to medium sized plants can be removed by pulling, but only if the entire plant including root system, can be removed. Pulling can be completed using a variety of tools ranging from skid steer attachments, weed wrench, grubbing hoe, and even a shovel. Larger plants may be easier to pull in early spring because the root systems are shallow and not interconnected. The soil, being moist this time of year, will also allow for entire root systems to be removed from the ground, reducing the likelihood of resprouting.

If using a skid steer, tractor or other large piece of equipment, in a highly infested area, follow up treatments will most likely be necessary. When using large machinery the timing of removal is important to the overall health of the forest stand. The removal may be better off if completed when the ground is frozen or at a minimum when the ground is not wet. Removing large amounts of vegetation from a given area using heavy machinery may also lead to erosion or soil compaction. Thus, care must be taken when planning to use large equipment for removal. This method should also not be used in sensitive areas (stream banks, steep hillsides, etc.) because it greatly disturbs the soil in these areas and can aid in the spread of other invasive species.



Figure 11: Weed wrench



Figure 12: Skid steer with tree pulling attachment

# Mowing/Shredding

**Treatment timeframe:** Early summer

**Equipment needed:** Forestry cutter, bullhog

**Estimated cost/acre:** \$500-600/acre

**Treatment scale:** Large (over 5 acres), trunk diameter greater than one inch, heavy infestation

Heavy duty brush cutters can be used to cut and shred mature honeysuckle infestations. Mowing and shredding is most effective when completed in early summer when food reserves for the plants are at their lowest. Mowing or shredding alone is not an effective means of controlling bush honeysuckle unless completed repeatedly throughout the growing season and for multiple years. However, mowing can be a very helpful site preparation method to facilitate herbicide applications.



Figure 13: Heavy duty brush cutter shredding bush honeysuckle

In very dense/mature stands where backpack spraying is impossible mowing may be necessary (see Figure 3). After mowing, wait until summer/fall and spray foliage of new shoots after they reach a height of 1 ft. In larger stands mowing can be used to cut parallel lines through the stand, thus facilitating herbicide mist application. This would allow an ATV mounted sprayer to be used, increasing the treatment rate.



Figure 14: Post shredding

# Aerial Spraying

**Treatment timeframe:** Late fall (typically the last two weeks in October and the month of November)

**Equipment needed:** Fixed-wing aircraft or helicopter

**Estimated cost/acre:** \$60-250/acre

**Treatment scale:** Large (150+ acres), medium to heavy infestation

Aerial spraying is proving to be a cost effective method for controlling medium to heavy stands of bush honeysuckle (see Figure 15). However, this method requires a contractor, and a relatively large treatment area. Due to the complexity of aerial spraying and limited contractor base, 150 acres or more is generally required by the contractor. To reach this acreage threshold neighboring landowners might consider having their properties sprayed at the same time.

The contractor will apply the spray solution using either a fixed-wing aircraft or helicopter using standard agricultural/forestry herbicide spraying procedures. Aerial spraying needs to be completed on a day (or days) when most of the forest tree canopy leaves have dropped for the fall, but while the honeysuckle is still holding green leaves. This is typically between the last week in October and the first two weeks of November. This greatly reduces the chances of native plants being harmed by the herbicide treatment. However, not all native plants will be dormant at the time of spraying so some collateral damage can occur in low to moderate honeysuckle infestations.



Figure 15: Helicopter aerial spraying forest with a heavy honeysuckle infestation

# Cost-Share

There are various cost-share assistance programs that are designed to help offset the costs of the initial honeysuckle control treatment. However, you will then be responsible for maintaining the area for a period of 10 years, which will involve periodic monitoring and follow-up treatments every 1-2 years. Two programs that can potentially provide financial assistance for bush honeysuckle removal cost-share are:

- Environmental Quality Incentives Program (EQIP)
- MDC Landowner Assistant Program (LAP)

EQIP is a federal Farm Bill program administered by the Natural Resources Conservation Service (NRCS) that currently offers incentive payments ranging from \$33-276/acre depending on the level of infestation. The LAP is an MDC assistance program that can potentially provide cost-share payments ranging from \$40-140/acre depending on infestation level and treatment method used.

If you are interested in enrolling or learning more about these programs contact your local MDC Private Land Conservationist for more information.



# Contractors

## **Native Landscape Solutions, Inc.**

Simon Barker  
9814 Gravois Road  
St. Louis, Missouri 63123  
636-373-1174  
simon@nativelandscape.biz

## **Stevens Sustainable Forestry LLC**

Josh Stevens  
511 Kleewood Drive  
Fulton, MO 65251  
573-220-7998  
josh.h.stevens@gmail.com

## **Quality Forest Management, LLC \***

Clinton Owenby  
102 Lane Garrett Dr.  
Marthasville, MO 63357  
573-289-0241  
COwenby@QFMLLC.com

## **Pizzo and Associates, Ltd.**

Corporate Headquarters  
Leland, IL  
815-495-2300  
info@pizzo.info

## **J&R Flying Service \*\***

John Smith  
Arkansas  
870-886-1999  
Jrfly870@gmail.com

## **KEE Forestry and Wildlife LLC**

7421 Bond Court  
Palmyra, MO 63461  
573-819-9930  
lancekarr@hotmail.com

## **Antlers and More Wildlife Habitat Solutions**

Korey Wolfe  
203 N. First Street  
Linn, MO 65051  
573-578-1887  
KWolfe.AandM@gmail.com

## **DJM Ecological Services, Inc. \***

Jon Wingo  
314-974-4282  
jwingo@djmeecological.com

## **Griesedieck Brothers Landscaping**

Tom Griesedieck  
7668 Lindbergh  
St. Louis, MO 63117  
314-805-1300  
tomg@gbrotherslandscaping.com

## **Long Forest Consultation \***

2200 Spanish Bluff Road  
Anna, IL 62906  
618-893-2307  
chris@longforestry.com

## **Curless Flying Service \*\***

Joe Curless  
Illinois  
309-759-5386

## **Total Resource Management \***

Jef Hodges  
Clinton, MO 64735  
660-885-6127  
jef@thehabitatprofessionals.com

\* Prescribed Burning

\*\* Aerial Spraying

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Please note that these contractors are not endorsed by the Missouri Department of Conservation. This list is provided for your convenience.