Chemical Control Of Unwanted Trees and Shrubs
Herbicide – A substance that is toxic to plants that are used to remove unwanted vegetation
Selective herbicide - kill specific targets, while leaving desired plants relatively unharmed.

**Triclopyr amine** – Element 3A (44% triclopyr)  
(broadleaves)  
Garlon 3A (44% triclopyr)  
Tahoe 3A (44% triclopyr)

**Triclopyr ester** – Garlon 4 (61% triclopyr)  
(broadleaves)  
Element 4 (61% triclopyr)  
Pathfinder 2 (13% triclopyr)

**Triclopyr ester + 2, 4-D** – Crossbow  
(16.5% triclopyr and 34.4% 2 4 D)  
(broadleaves)
Non-selective herbicide- kills all plant material with which they come into contact.

**Glyphosate** - RoundUp
   Accord XRT 2
   Razor
   Rodeo*  Labeled for Aquatic use
Lets quickly go over personal protective equipment (PPE)…..

When using herbicides, the minimum PPE should be:

- Protective eyewear
- Chemical gloves
- Long sleeve shirt
- Long pants
- Rubber boots + socks

Always consult the label for any additional PPE required
Foliar

Applications use a low rate of herbicide, but large amounts of solution may be needed to cover all the leaves.

Risk of damaging non-target plants through over spray.

Plants must have active leaf canopy.
Herbicide must be applied at a pressure that minimizes spray drift.

Spray to the point of complete coverage, but not until run off.
The use of a non-ionic surfactant may increase control by spreading out the water droplet and help active ingredients penetrate waxy cuticle. But be careful of toxicity issues!
Foliar

Equipment needed:
Cut Stump Treatment

Plants cut near the ground - within 6” from the ground.

Cut surface is treated with herbicide

For stems less than 2” treat entire surface

For larger stems, treat the outer 1” of the stump.
Cut Stump Treatment

Important things to remember…

If using solution mixed with water, apply in temps above freezing. As temps get colder, concentration of chemical needs to increase!

Once plant breaks bud in late winter/early spring, treatments lose effectiveness because sap is rising.

If using oil based solution, do not apply in temps above 85 degrees…may volatize and harm non-target plants.
Cut Stump Treatment

Plants cut near the ground - within 6” of the ground.

Cut surface is treated with herbicide

For stems less than 2” treat entire surface

For larger stems, treat the outer 1” of the stump.
Girdle + Treat

Saw is used to sever the outer portion of vascular structure.

Chemical is sprayed into cut zone.

Hand sprayer and 20-50% chemical needed depending on chemical used and season.

As with all treatments, the addition of dye will help track treatments.

Primarily used during the fall and winter.
Off Target Injury

Off target movement

Chemical Volatilized
Common invasive exotics in the woods and their control

Invasive Shrubs/trees, their chemical control, and timing.

Honeysuckle
Autumn olive
Multiflora rose
Buckthorn
Burning bush
Privet
Oriental Bittersweet
Tree of Heaven
Mulberry
Japanese Hops
Japanese Barberry
Honeysuckle – *Lonicera*

Foliar: Apply 1.5-2% glyphosate in water to foliage. In fall after first frost. Apply 2% triclopyr (the 3’s) in summer – late fall. 45-50 degree F temps for foliar uptake

Cut stump: 10-15% triclopyr in fall.
Hack and Squirt: 25% triclopyr (amine) + 3% Imazapyr = 1 hack per 2 inches of DBH
Basal Bark: Apply 10-20% triclopyr in oil
Autumn olive – *Elaeagnus umbellata*

Foliar – shrubs less than 6’ tall – 2-4% glyphosate or 1-2% triclopyr in water.

Cut stump – stumps 10-25% glyphosate in water or 20-25% triclopyr in water or oil.

Basal bark – 20-30% triclopyr (the 4’ s) mixed with oil.
Multiflora rose – *Rosa multiflora*

Foliar – 2-4% glyphosate or 1-2% triclopyr (3’s) in water. triclopyr + 2,4,D is highly effective just after flower drop

Cut stem – 25-50% glyphosate or 20-25% triclopyr (4’s)

Basal bark – 20% triclopyr (4’s) in oil.
Thin Line Spray (undiluted triclopyr + 2,4,D) on canes <1/2 inch in caliper
Spot Concentration – Banvel or Krenite directly on root crown
Foliar – Apply 1.5-2% in water to foliage. In fall after first frost. Apply 2% triclopyr (the 3’s) in summer – late fall.

Cut stump – 20-25% glyphosate or 12.5% triclopyr (4’s) in oil

Basal bark – 20-30% triclopyr (the 4’s) mixed with oil.

Forestry mower / spray stumps or resprouts with foliar application
Ironwood—*Ostrya virginiana*

Foliar: Apply 1.5-2% glyphosate in water to foliage. In fall after first frost. Apply 2% triclopyr (the 3’s) in late summer – early fall. 45-50 degree F temps for foliar uptake

Cut stump: 10-15% triclopyr in fall.
Basal Bark: Apply 10-20% triclopyr in oil
Burning Bush—*Euonymus alatus*

Foliar – Apply 1.5-2% in water to foliage. Early summer treatments.
Apply 2-4% triclopyr (the 3’s) in summer.

Cut stump – 20-25% glyphosate or 12.5% triclopyr (4’s) in oil. Late summer - fall

Basal bark – 20-30% triclopyr (the 4’s) mixed with oil. Late summer – fall

Forestry mower / spray stumps or resprouts with foliar application
Privet—*Ligustrum*

Foliar – Apply 2% glyphosate in water to foliage during the active growing season
Apply 2% triclopyr (the 3’s) with surfactant during the active growing season

Cut stump – 20-25% glyphosate or 12.5% triclopyr (4’s) in oil. Late summer - fall

Basal bark – 20-30% triclopyr (the 4’s) mixed with oil. Late summer - fall
Foliar – Apply 2% triclopyr (the 3’s) in water with surfactant. Just after full leaf expansion until color change.

Cut stump – 20-25% glyphosate or 12.5 -20% triclopyr (4’s) in oil. Triclopyr has longer application period than glyphosate.

Basal bark – 20-30% triclopyr (the 4’s) mixed with oil.
Tree of Heaven—*Ailanthus altissima*

Cut stump – 25% glyphosate or 12.5% triclopyr (4’s) in oil

Basal bark – 20-30% triclopyr (the 4’s) mixed with oil.

Hack and Squirt: 25% triclopyr (amine) + 3% Imazapyr = 1 hack per 2 inches of DBH

Hit this one hot and don’t give it a chance to get mad!
Mulberry – *Morus alba*

Cut stump – 20-25% glyphosate or 12.5% triclopyr (4’s) in oil

Basal bark – 20-30% triclopyr (the 4’s) mixed with oil.

Hack and Squirt: 25% triclopyr (amine) + 3% Imazapyr = 1 hack per 2 inches of DBH
Japanese Hops— *Humulus japonicus*

**Foliar**
- 2% Glyphosate
- 1-2 lbs /A of 2,4,D
- 16 fl Oz./A triclopyr 4
- 1 oz/ A Metsulfuron “escort”
- 7F Oz/A Aminopyralid “milestone”

**Fire** – Spring kills germinants but they are quickly replaced (*Control <50% in season, <50% season after*)
Mechanical

Hand Pulling
(70-90% in season, 50-70% season after)
- Prior to seed set
- Remove and Burn/bury
*Can reroot from material on soil surface
*3 year seed bank

Mowing
(70-90% in season, 50-70% season after)
- Prior to seed set
- Complete + bagging/burning
- 3 year window
Japanese Barberry – *Berberis thunbergii*

Foliar: Apply 1.5-2% glyphosate in water to foliage. In fall after first frost. Apply 2% triclopyr (the 3’s) in summer – early fall. 45-50 degree F temps for foliar uptake.

Cut stump: 10-15% triclopyr in fall.
Basal Bark: Apply 10-20% triclopyr in oil + 3% Imazapyr

Mechanical – Mow late summer, burn in fall, spray resprouts in spring.
Remember to calibrate your sprayers often.

Follow the label rates and application methods suggested.

Use a combination of mechanical, chemical, and burning.

Remember overspray and be good neighbors!

Follow-up treatments might be needed.

Seed Bank Longevity

Oriental bittersweet
Tree of heaven
Teasel
Japanese hops
Autumn olive
Bush honeysuckle
Garlic mustard
Japanese stiltgrass
Musk thistle
Multiflora rose
Sericea lespedeza

Years

0 5 10 15 20 25 30 35 40

Chris Evans
Quick mixing rates:

128oz = 1 gallon

1/4% = .32oz/gal = .96oz/3gal
1/2% = .64oz/gal = 1.92oz/3gal
1% = 1.28oz/gal = 3.84oz/3gal
1.5% = 1.92oz/gal = 5.76oz/3gal
2% = 2.56oz/gal = 7.68oz/3gal
3% = 3.84oz/gal = 11.5oz/3gal
5% = 6.4oz/gal = 19.2oz/3gal
10% =12.8oz/gal =38.4 oz/3 gal
20% =25.6oz/gal =76.8 oz/3 gal
50% =64 oz/gal =192 oz/3 gal