**Flame Weeding & Limited-Use Herbicide for Vegetation Management**[1]
**Cornell University Cooperative Extension**
May 2007

Project Leader: Peter J. Smallidge, pjs23@cornell.edu, 607/ 592 – 3640, www.ForestConnect.info

---

**Objective:**
*Overall* – Evaluate the potential for landowners to use flame technology and low input herbicides to effectively and efficiently control undesired forest vegetation
*2007* – Establish research plots at the Arnot Forest and in 6+ locations throughout NY to evaluate treatment effects on any of several invasive shrubs, striped maple, American beech, and other clonal woody plants.

**Campus Contribution:**
The project leader will visit each site to assist with equipment and the materials and application of treatments. Aluminum numbered tags will be provided for each project collaborator. There is no cost to CUCE educators or collaborators for treatment materials.

**County Contribution:**
County collaborators must include a CUCE educator and a land owner/manager. County collaborators will select a site based on project specifications, collect data prior to treatment, assist with treatment application, and collect follow-up data in the fall and subsequent early summer. Copies of written data are provided to the project leader.

*Estimated time investments*: site selection and pretreatment measurements; site visit with PI for treatments; data collection at end of growing season; data collection after leaf-out the following growing season. 4 visits to site, 2 hours per visit, spread over 12 to 18 months.

[1] The specific details of some treatments may change.

**Methods:**

*Invasive Shrubs (FLAME)*[2] – Identify locations having specimens of either barberry (*Berberis thunbergii*); multiflora rose (*Rosa multiflora*); invasive honeysuckle (*Lonicera* spp.) or autumn olive (*Elaeagnus umbellate*). For each species to be treated, permanently mark 30 clumps or stems using wooden stakes and aluminum numbered tags. Randomly assign the 30 clumps or stems (experimental units) into one of three treatments. One treatment is a control (C), another is a single treatment after leafout (SA) and the third treatment is a double treatment after leafout (DA). Treatments should be applied May 15 to June 15, and a second treatment 6 weeks later. Flame is applied at ground level for 20 seconds on clumps with a diameter up to 36", 30 seconds for clumps having a crown diameter greater than 36".

For each clump or stem, record clump height and diameter and number of sprouts at ground level. Assess plant mortality in early September by repeating the clump measurements.

Equipment: tally sheets, wooden stakes, aluminum tags, flagging/paint, carpenter's steel tape measure, safety glasses, pump extinguisher, cell phone and fire department phone number, rake.

*Sub-canopy Trees (FLAME)* – Identify locations with at least 20 stems of striped maple, hophornbeam, hornbeam, black birch or other undesired hardwood larger than 1" dbh. Tag stems for research using numbered aluminum tags. Randomly assign half of the stems to the control treatment (C) and the other half to the flame treatment (F). Flame is applied at ground level between May 15th and June 15th for 10 seconds. Stems are measured for dbh and number of basal sprouts within 12" of ground level.

Revisit stems in September to assess mortality. Record the condition of the foliage as normal, unthrifty, or absent. Record the number of living sprouts within 12" of ground level. Repeat the assessment of treatment effect in mid-June of the year following treatment.

Equipment: tally sheets, aluminum tags, flagging/paint, diameter tape, safety glasses, pump extinguisher, cell phone and fire department phone number, rake.

---

[2] Review safe use of flame thrower with tncweeds.ucdavis.edu/products/handbook/23.spotburn.doc as a guide.

*American beech and other clonal woody species (HERBICIDE)*[3] – Identify locations with approximately one to 2 acres of forest with beech (or other clonal species) as a common component of the forest. Field methods will depend on whether the site is with or without larger stems.

A) LARGER STEMS: Establish the center of a circular plot (64.5' radius) in an area having at least 20 beech with a dbh greater than 6". The plot cluster will include three types of plots:
   a. Seedling plots are from 8 to 10' in radius. Select a radius that will allow recording at least 10 beech stems/plot that are 24" tall to 0.99 inches in diameter. Establish up to 4 seedling plots.
   b. Sapling plots are 26.3' in radius (1/20$^{th}$ of an acre). Measure all beech, in one-inch size classes, from 1 to 5.99 inches dbh. Mark all measured stems with flagging or lumber crayon. Remove any standing dead beech.
   c. Overstory plots are 64.5' radius (0.3 acre). Measure all trees greater than 6" dbh. Mark all beech 6" and larger for cutting. Cut all beech and apply herbicide at a rate of 4 ml per inch of stump diameter using 40.4% AI of glyphosate (3:1 dilution of Accord concentrate at 53.8%). Treat stumps immediately after cutting. Remove any standing dead beech.

B) B) SMALLER BEECH STEMS: Establish the center of a circular plot (64.5' radius) in an area having at least 15 beech with a dbh greater than 4". The plot cluster will include three types of plots:
   a. Seedling plots are from 8 to 10' in radius. Select a radius that will allow recording at least 10 beech stems per plot that are 24" tall to 0.99 inches in diameter. Establish up to 4 seedling plots.
   b. Sapling plots are 26.3' in radius (1/20$^{th}$ of an acre). Measure all beech, in one-inch size classes, from 1 to 5.99 inches dbh. Mark all measured stems with flagging or lumber crayon. Remove any standing dead beech.
   c. In the sapling plot, select a threshold diameter for a diameter limit cut of beech, such that all beech greater than 3", 4" or 5"

[3] For clonal species other than beech, adjustments will be made to the study design to account for differences in plant features. Other clonal species might include: black locust, aspen/popple,

are cut. Select a diameter threshold that will allow cutting of approximately 12 to 15 trees or more. Mark beech to be cut. Cut all beech and apply herbicide at a rate of 4 ml per inch of stump diameter using 40.4% AI of glyphosate (3:1 dilution of Accord concentrate at 53.8%). Treat stumps immediately after cutting. Remove any standing dead beech.

**Equipment Suppliers:**

- 10 lb. clear propane tank, $102.00. http://www.lpgastanks.com/propane-tanks/lc10
- Propane Torch with ignitor, $29.99. item 91037 – 2VGA, http://www.harborfreight.com/cpi/ctaf/Displayitem.taf?itemnumber=91037
- 10 lb metal tank, $44.99 http://www.domsoutdoor.com item 1-062521

**References:**


Nyland, RD et al. 2006. Interference to hardwood regeneration in northeastern North America: controlling effects of American beech, striped maple, and hobblebush. North. J. Appl. For. 23(2): 122 – 132.

Ward, JS and TE Worthley. 2006. Control of Japanese barberry (Berberis thunbergii DC): preliminary results. CT Agric Expt. Sta. unpubl. Report. 4 pp.

Kochenderfer, JD et al. 2006. Controlling beech root and stump sprouts using the cut-stump treatment. North. J. Appl. For. 23(3): 155 – 165.

Kochenderfer, JD et al. 2004. Preharvest manual herbicide treatments for controlling American beech in Central West Virginia. North. J. Appl. For. 21(1):40 – 49.