Buckthorn Ecology and Eradication

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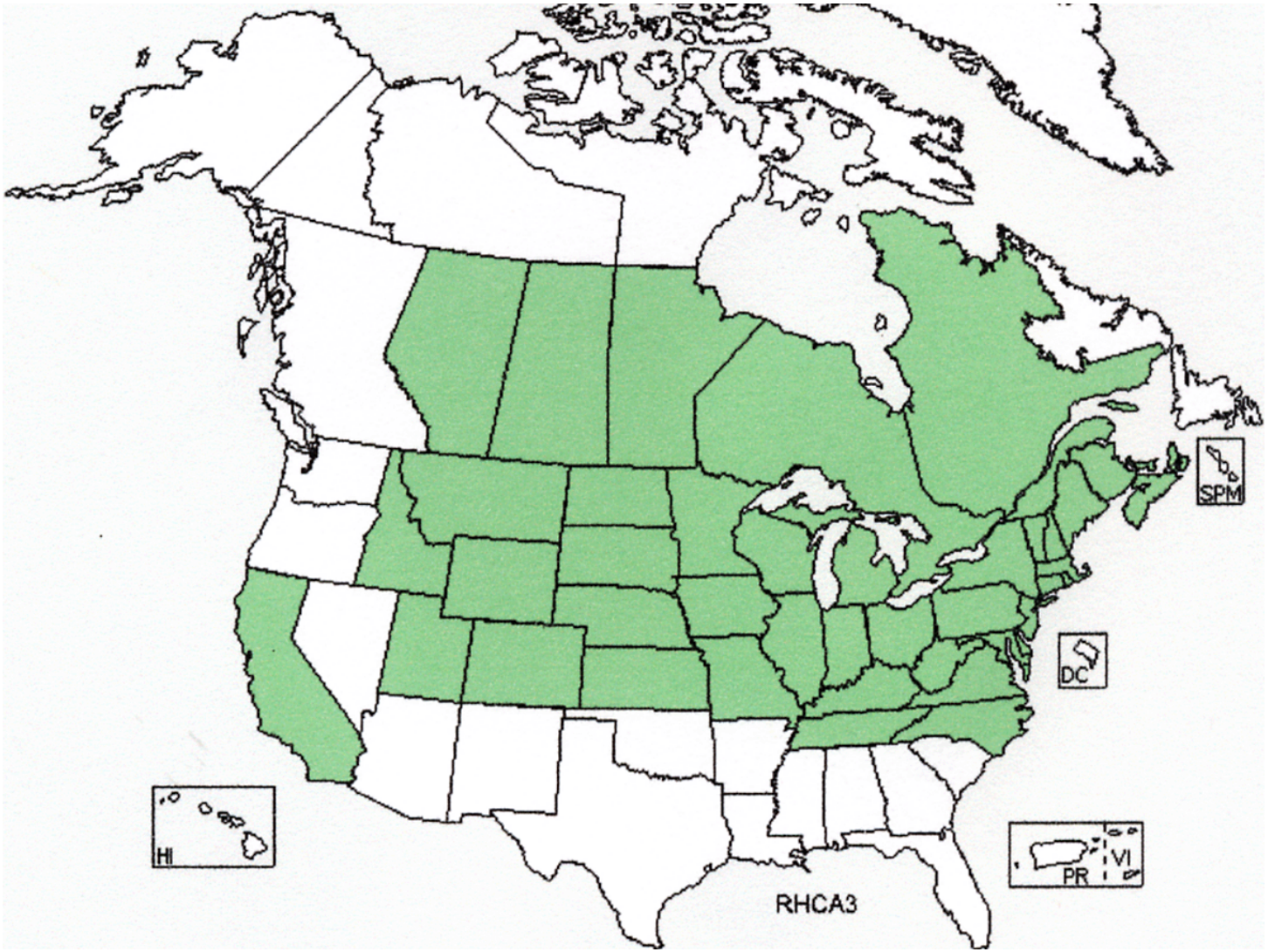
- Buckthorn is a European plant
- Is a strong calciphile
- In early stages, a diffuse, many-stemmed bush
- In old-growth, a single-stemmed tree with a dense crown
- Young bushes very shade tolerant
- Regenerates strongly from cut stems
- Endotrophic mycorrhizal

Godwin: Jour. Ecology 1943, Vol. 31, pp. 69-76



U.S.D.A.

Wall of Buckthorn

Dense monoculture

Produces a toxin active against other plants (allelopathic)

Relation to available light

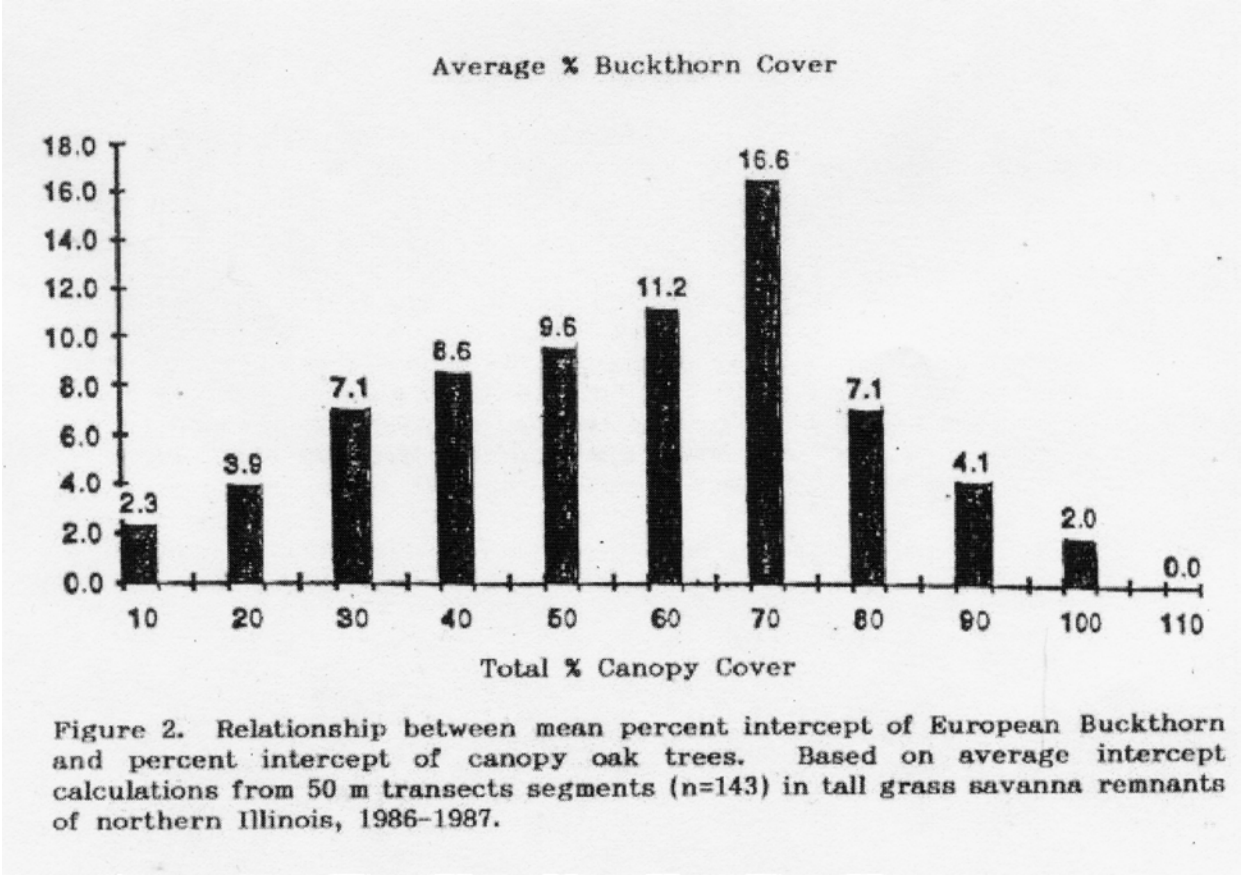
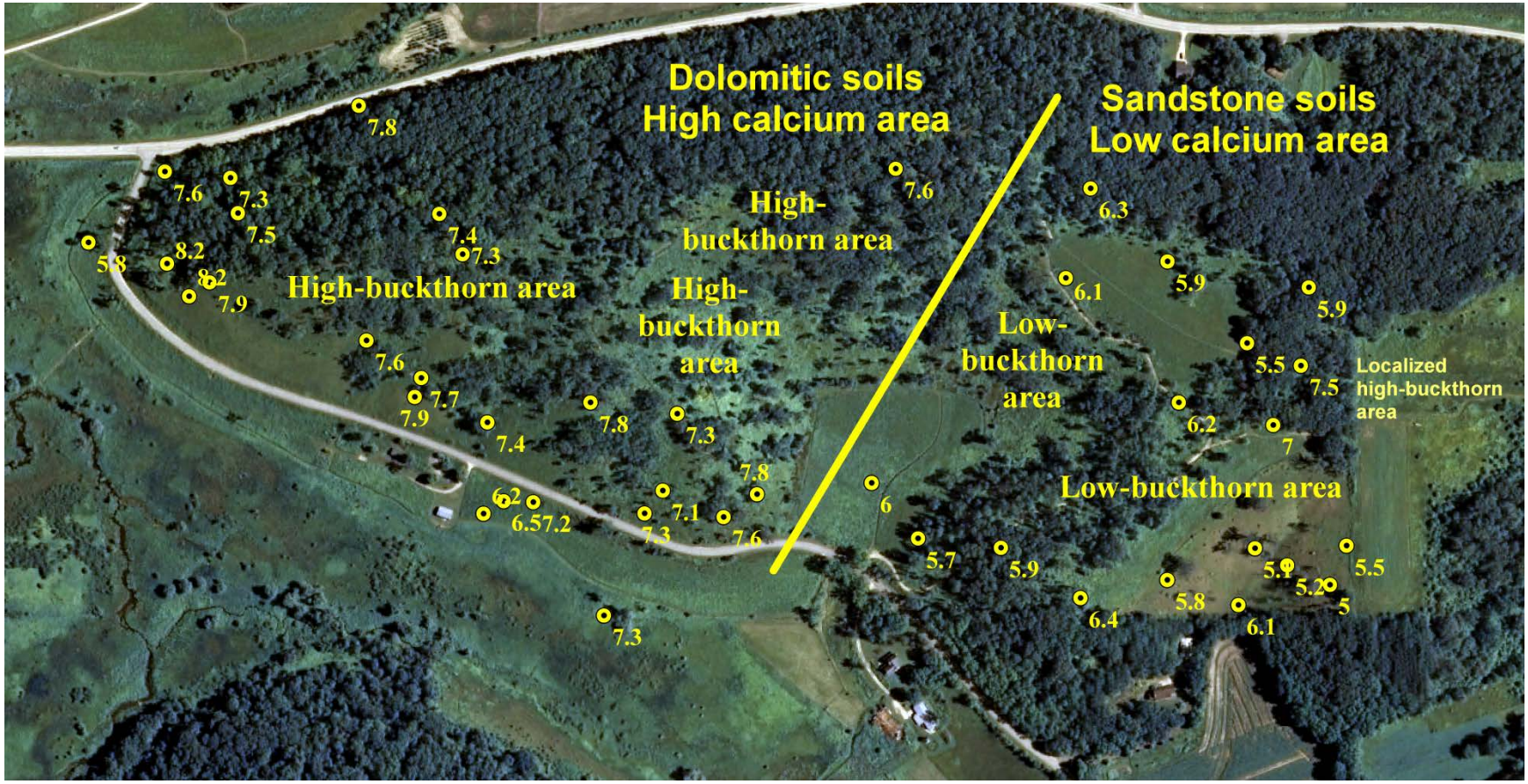


Figure 2. Relationship between mean percent intercept of European Buckthorn and percent intercept of canopy oak trees. Based on average intercept calculations from 50 m transects segments (n=143) in tall grass savanna remnants of northern Illinois, 1986-1987.

Apfelbaum and Haney 1987

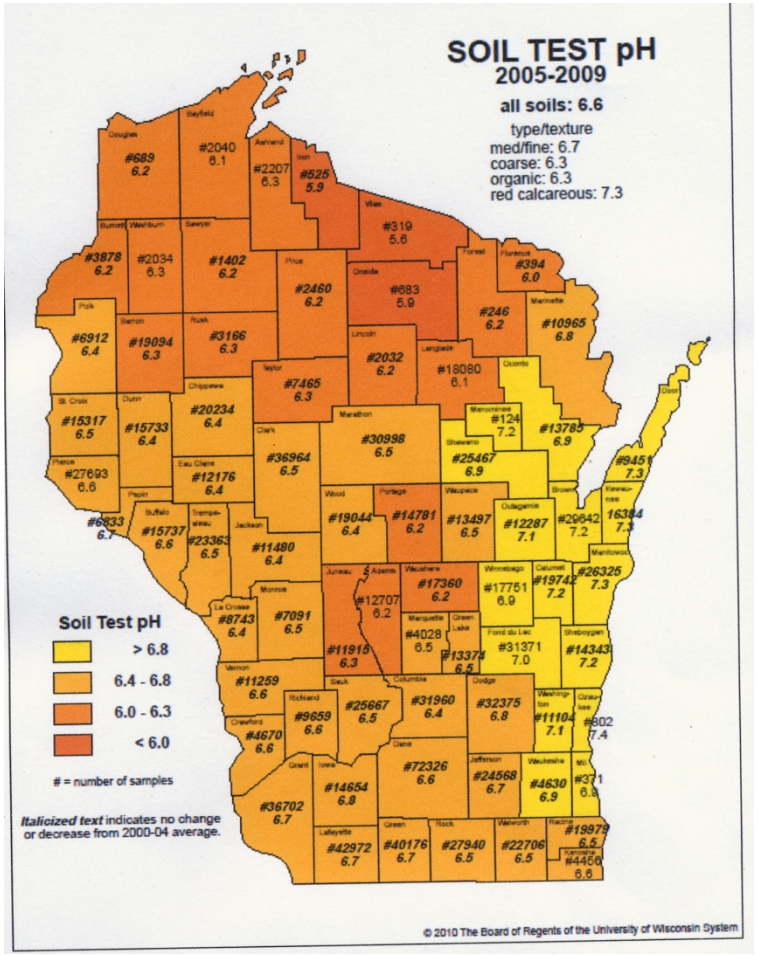
Buckthorn as a Calciphile
Pleasant Valley Conservancy Wisconsin State Natural Area

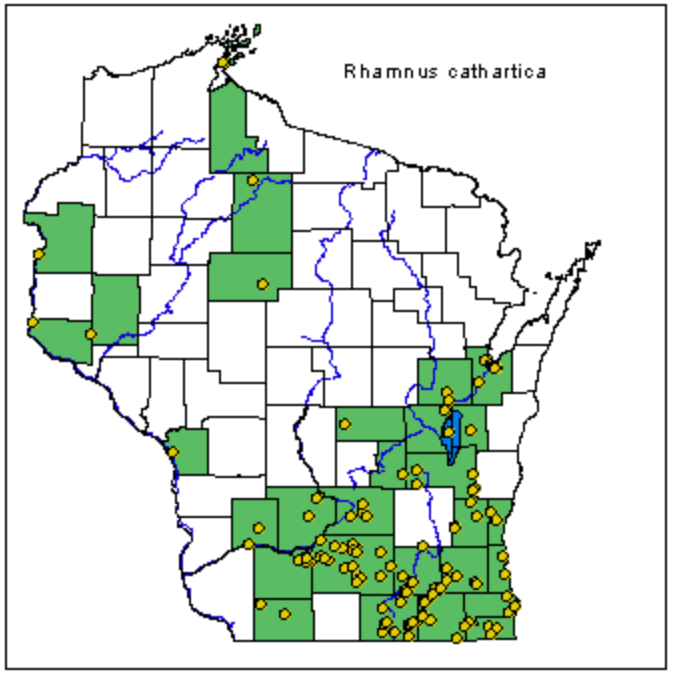


Driftless Area: Bedrock controls soil chemistry

High pH correlated with high calcium

Locating “high-risk” areas





Low pH areas likely to be low Calcium and to be less likely to have buckthorn problems

Before removal

Denniston: UW-Madison Lakeshore Preserve

After removal

But this is just the start of a long eradication program!

Denniston: UW-Madison Lakeshore Preserve

Prolific *seed* producer

Dioecious: Male and Female Plants

Prolific *seedling* producer

Wood chip pile!

Seed bank lasts only about three years, but that is only the beginning

Allelopathy: Post-removal buckthorn desert

After the buckthorn were removed (left photo) it took about 3 years before prairie/savanna species could be established at this site (right photo).

Role of herbicide in eradication

Cut stem not treated with herbicide

Cut stems treated with triclopyr (Garlon 3A). Glyphosate also works.

What does fire do?

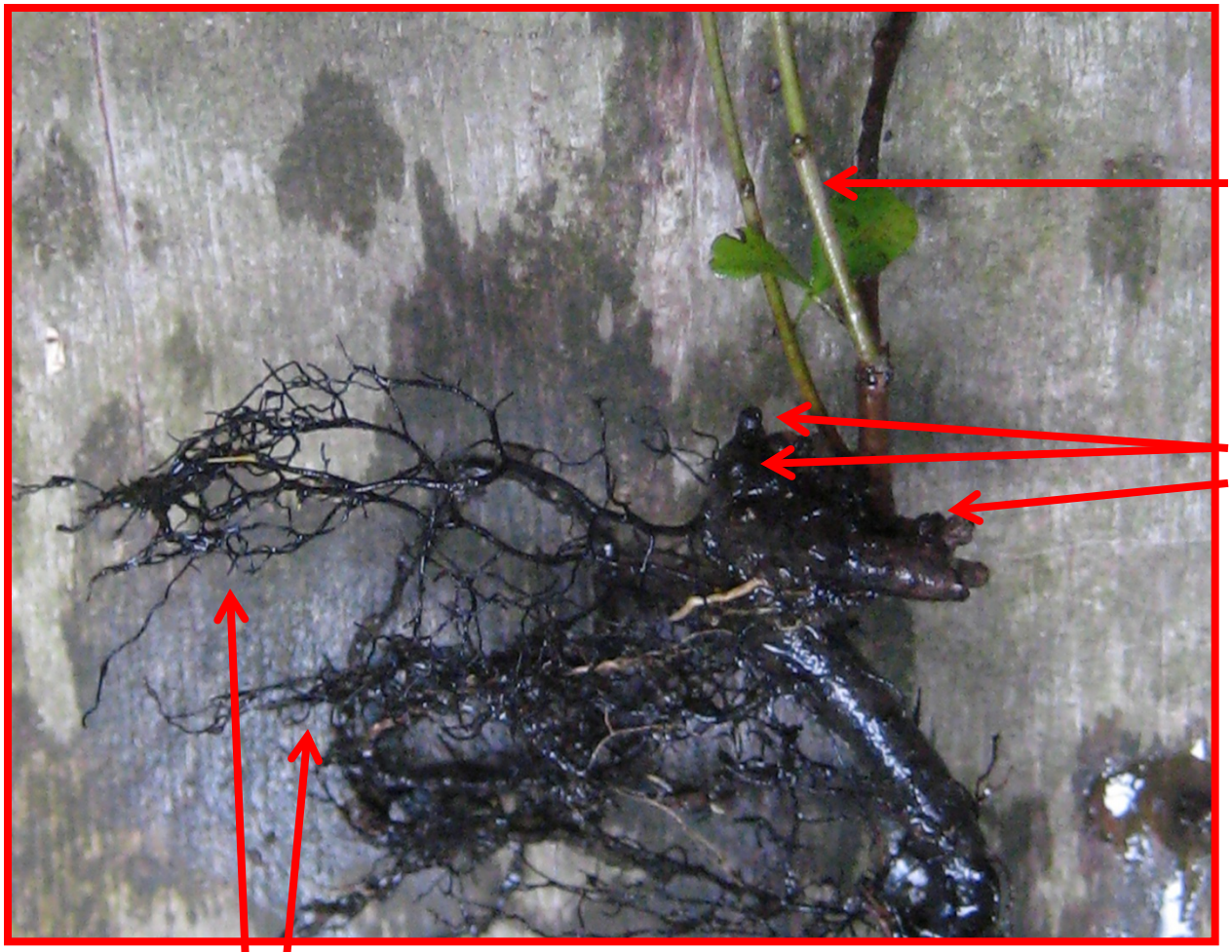
Top kills but does not eradicate

Root collar anatomy

Buckthorn plant that grew about 10 years after initial removal of large plants. This is NOT a seedling!

Root mass. See enlarged image on next slide.

Root collar anatomy



Results: after over 10 years of **annual** burning

- Resprouts continue to appear
- **Not** from seed bank but from cryptic root masses
- These root masses are remnants of the original buckthorn infestation
- In one area of around 1000 square feet, over 100 shoots appeared **ten years** after eradication, even with annual herbicide treatment of each new shoot.

Eradicating Buckthorn is a Multi-Step Process

Annual Burns Strongly Recommended

Top-kills buckthorn and other woody vegetation

Eradicating Buckthorn

Marked shoot being followed

After burn: late spring foliar spraying of new shoots arising from top-killed plants: glyphosate or triclopyr

Eradicating Buckthorn

Buckthorn Leaf Spritz During Summer Growing Season

- 20% Garlon 4 in bark oil
- Brief “spritz” of only *two* upper leaves from hand spray bottle
- Visible effect in 2-3 days; plant dead in a week
- Quick, easy
- Causes no peripheral damage
- Don’t have to reach base

Eradicating Buckthorn

Buckthorn plants remain green after native vegetation has senesced and can be sprayed

Early
Fall
Foliar
Spray

Native vegetation has senesced so is not affected

Use 2% glyphosate or Garlon 3A (aqueous)

Eradicating Buckthorn

Early Fall Foliar Spray

- After native vegetation has senesced
- Buckthorn still very visible because leaves do not turn
- Foliar spray with Garlon 3A (preferred) or glyphosate
- Systematic canvas of area

Eradicating Buckthorn

Basal bark with Garlon 4 at base of woody shoot

Small plants with hand sprayer

Large plants with backpack sprayer

Recommendations

- Do all of these
- Annual burning to top-kill (after removal of major infestations (don't burn first!)
- Late-spring post-burn foliar spraying of all new shoots
- Mid-summer leaf spritz of knee-high plants
- Late fall foliar spraying after native vegetation has senesced
- Basal bark treatment throughout the winter

Eradicating Buckthorn

- Annual monitoring of at-risk areas is recommended (virtually forever!).
- Areas should be reseeded with native vegetation after initial buckthorn removal (may need to seed for 3 or more years until allelopathy has dissipated).

Success story
Buckthorn-free savanna

Site with high-calcium soil and high risk of buckthorn.

First cleared of buckthorn in 1999-2000

Still monitored annually, but now virtually buckthorn-free