Buckthorn Management and its effects on native forest self-regeneration

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Buckthorn Invasion

- Aggressive competitor
- Longer growing season
- Shades out other plants
- Alters soil properties
- “Invasion meltdown”
- Likely negatively allelopathic
Buckthorn Control at the Arboretum
1997-1998
Buckthorn Control at the Arboretum
2014-2015
To determine the effect that buckthorn removal and continued control have on native forest community self-regeneration.
Employee Parking Lot

Arboretum

Wertle Boardwalk

Carver

Ridge Trail
“...[A]bout 807 seeds/m² beneath mature buckthorn. The seeds remain viable for 1-5 years” (Moriarty 1998).

“...[T]here are numerous anecdotal descriptions of dense R. cathartica thickets associated with the loss of native species but few studies that have quantified these patterns” (Knight et al 2007).

“...[B]uckthorn soils inhibit native forbs as much as, or more than, their canopies... [and] significantly alters native understory plant communities” (Klionsky et al 2010)

“...[R]estoration efforts may be undermined if the physical properties or fertility of the soil and the processes associated with nutrient cycling have been significantly altered by [buckthorn]” (Heneghan et al 2004).

“...[T]he chronic failure of restoration, subsequent to management of buckthorn, is associated with these modified soil properties” (Heneghan et al 2005).
Methods

• Defined three areas: (MHs38/39)
  • Removed (Ridge trail)
  • Buckthorn present (Tamarack Lake)
  • Uninvaded (Townsend woods)
• Two, 6 yard$^2$ plots per area
• Semi-random placement based on access and observed similarities
• Density vs cover vs biomass
Buckthorn removed plots
Uninvaded Plots
Results
Measuring diversity

- Density vs cover
- Richness
- Evenness (Shannon-Wiener)
<table>
<thead>
<tr>
<th></th>
<th>U 1</th>
<th>U 2</th>
<th>R 1</th>
<th>R 2</th>
<th>B 1</th>
<th>B 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species present (richness)</td>
<td>22</td>
<td>15</td>
<td>21</td>
<td>24</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>SW (evenness)</td>
<td>3.52</td>
<td>3.01</td>
<td>3.51</td>
<td>3.87</td>
<td>0.35</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Discussion
Implications for the Arboretum

• Buckthorn control has had significant positive impact on native forest community regeneration here
• It impacts forest health and aesthetic
• It furthers our conservation image and mission