ML2014 Project Abstract
For the Period Ending December 30, 2019

PROJECT TITLE: MITPPC Sub-project #4 Cover it Up! Using plant to control buckthorn
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FUNDING SOURCE: Environment and Natural Resources Trust Fund
LEGAL CITATION: ML 2014, Chapter 312, Article 12, Section 8

APPROPRIATION AMOUNT: $327,000
AMOUNT SPENT: $327,000
AMOUNT REMAINING: $0

Sound bite of Project Outcomes and Results

Buckthorn degrades the health of Minnesota forests. Efforts to control buckthorn generally yield only short-term benefits, since buckthorn quickly returns. We found that densely establishing native plants that have leaves early in the spring and late in the fall can shade out buckthorn and reduce the need for repeated management.

Overall Project Outcome and Result

Buckthorn is an invasive shrub that outcompetes native plants and degrades Minnesota forests. Removal of buckthorn is a common management activity but often only provides short-lived benefits since buckthorn rapidly re-establishes. In grasslands, heavily seeding native species can often restore native communities and inhibit invasion, but this approach is rarely used in forest management (Schuster et al. 2018). We investigated whether we could similarly establish enough native plants to prevent buckthorn from re-establishing in forest using three separate experiments.

First, we surveyed sites at 24 properties in Minnesota where buckthorn management had taken place to identify the most successful techniques (Wragg et al. in review). Management success was highly variable, but sites where more native vegetation had been re-established tended to have lower buckthorn abundance.

Second, we measured the growth and survival of buckthorn seedlings in a forest biodiversity experiment. There, we found that canopies that permitted less than 10% of incoming light had significantly reduced buckthorn growth and canopies that permitted less than 3% light, particularly in the spring and fall, completely excluded buckthorn (Schuster et al. 2020).

Third, we established a series of experiments across 7 sites that had recently had buckthorn removed. In those experiments, we tested how densely seeding or planting native plants affected buckthorn seedlings. After 3 years, we found that planting trees and shrubs, particularly *Sambucus* shrubs, greatly reduced light levels and excluded buckthorn (Wragg et al., Schuster et al. in prep). Other seeding and planting treatments had more moderate effects and may require additional years to become fully effective. We also found that the rarely-used herbicide fosamine ammonium was effective at controlling buckthorn (Schuster et al. in review).

The Cover It Up! project illustrates that it is possible to curate native plant communities in a way that makes them resistant to buckthorn invasion. In general, we recommend that forests be managed to promote the establishment of shrubs and trees that provide heavy shade in the spring and fall. Our findings suggest that by doing so, managers can simultaneously increase forest health, inhibit invasion, and reduce the need for investment in future buckthorn removals.

Project Results Use and Dissemination

Results were disseminated through diverse media to a wide range of stakeholders. Findings from Cover It Up! were included in five academic journal articles to date. Stories about our project were featured in media from unaffiliated parties, including KARE 11, Pioneer Press, National Park Service social media, and Science Museum of Minnesota Field Notes. Our findings were also conveyed through 12 in-person presentations for over 500 attendees.