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NORTHWOODS
STEWARDSHIP CENTER

WLEF Grant Final Report

NorthWoods Stewardship Center

East Charleston, VT

Forwarding trailer and implementation of

low-impact timber harvests in the Northeast Kingdom

April 13, 2015

Project Summary

From grant proposal:

This project addresses a supply chain gap between small land ownerships and local sawmills. An increasing number of landowners hold less than 40 acres, and are highly sensitive to the aesthetic and ecological impacts of timber harvests. At the same time, volume-oriented decentralized markets push loggers to invest in larger equipment with higher visible impacts, and to transport products out of Vermont to larger mills. Our Working Lands Enterprise grant funded the purchase of a 5-ton log forwarding trailer and expansion of our forestry services and on-site demonstrations, while increasing locally processed wood products. Small-scale, frequently conducted harvests with concentrated impact on a permanent road network are uncommon in the Northeast Kingdom, but well matched to small acreages, and collaborative log sales can increase economic viability of harvests. These benefits have drawn interest from landowners who might otherwise reject timber harvesting, thereby increasing working land acreage and awareness of local wood resources. With relatively low upfront investment and many potential clients, this model is highly replicable by regional loggers.

Project Approach

Several phases were undertaken during the grant period. Preliminary steps, completed in April-June 2014, included the purchase of a Metavic 1150M14 forwarding trailer, modifications and additions to existing tractor and logging equipment, research of OSHA requirements, workers compensation and liability insurance options, and staff training. An outreach program at NorthWoods in late April briefly demonstrated the low-impact winching/forwarding system to 10 landowners. With equipment set up and administrative requirements in place, the next phase was to conduct a demonstration timber harvest in the NorthWoods forest. Trail construction and timber marking for this demonstration site was completed in August 2014, but most harvesting was postponed until December 2014 due to presence of breeding birds and wet summer conditions. In September 2014, we began our first contracted harvest with a landowner in Morgan, VT, consisting of two small (~1 acre) early-successional wildlife habitat patch cuts funded in part through the NRCS WHIP program. Our second contracted harvest, a thinning and uneven-aged conversion of a sugar maple stand in East Burke, VT, was conducted from February-March 2015; a third contracted harvest was completed in late March 2015 in a 4 acre red pine/Norway spruce plantation in Bloomfield, VT. Public outreach programs were organized in October 2014 and March 2015, both including a demonstration of the forwarding trailer and discussion of low-impact harvesting techniques. Market research (log buyers and potential clients) and advertising was ongoing through the project, with resources compiled to be more easily available for future projects.

Goals and Outcomes Achieved

Goal: Greater number of small-acreage (10-40ac) woodlot owners implementing forest management plan with sustainable commercial timber harvests and forest improvement work

Expected Outcome: At least 3 Northeast Kingdom landowners conducting timber harvests as part of this project in 2014. Harvests meeting or exceeding sustainability guidelines from Vermont Family Forests, Tree Farm System, or other recognized organization. Minimum of 3 landowners scheduled for harvesting in 2015 and following years.

During the grant period, harvests were conducted on 4 forest parcels in Orleans, Essex and Caledonia counties. All properties had a previously-prepared forest management plan, and 2 of the properties were smaller than 30 acres. All silvicultural treatments focused on improving the long-term health and/or value of the stands; 2 harvests were commercial thinning, leaving better growing stock for future management, and 2 harvests were specifically planned to enhance wildlife habitat. Residual damage and ecological impact was minimal on all properties, easily meeting Vermont Family Forest harvesting guidelines. 3 additional harvests are tentatively scheduled for after the grant period, with several other landowners expressing interest.

Goal: Reduced environmental impact in small harvests by using scale-appropriate equipment, permanent trail layout and winching of logs to trails

Expected Outcome: Damage after harvest limited to no more than 5% of residual trees/10% of regeneration stems; soil impact limited to duff layer and less than half of A-horizon depth

With appropriate trails/harvest layout, directional felling and careful equipment use, environmental impact was even lower than anticipated. Estimated residual tree damage was less than 5%, and was mostly limited to crown damage during felling (rather than basal scrapes common with skidding). Regeneration damage was avoided during felling and by winching logs to trails, with approximately 10% of desirable stems damaged in harvest areas. Regeneration cutting (group selections of $1/20^{th}$ to 1 acre, and a declining plantation overstory removal) should establish new seedlings in the next 3-8 years. Harvesting conducted in winter (3 of the 4 sites) created no rutting and very minimal duff removal where tire chains dug through the snowpack, and the 1 fall harvest left only slightly more soil impact with minor compaction and rutting in trails (easily repaired with hand tools). In 3 of the 4 harvests, some permanent trails already existed, and the area of new trail/equipment access was very low (approximately 10-15 percent of harvest area). Harvest trails are slow to regenerate and alter soil structure for decades, so a key element of these low-impact harvests was to limit the areas where equipment was driven (also reducing the chance for damage to residual trees).

Goal: Marketing of logs in higher value categories through coordinated harvests on multiple small woodlots

Expected Outcome: No more than 10% of volume sold in lower product class; (revenue to landowner per unit volume increased by at least 10%)

In all harvesting, care was taken to harvest and sort logs into appropriate categories. This was easily achieved on 2 of the harvests, where over 95% of harvested wood (estimated) was small-diameter or poorly formed hardwood, and was kept by the landowner as fuelwood. On the remaining 2 harvests, sawlog specifications obtained before harvesting were used to sort logs and maximize harvest value.

Coordination of trucking across jobs was not feasible with the locations of the 4 harvests, but 2 harvests didn't require trucking (firewood was left on-site for the landowner), and trucking was minimized on the other 2 sites by mixing truckloads of different log products. In some forest areas with difficult access, the cost of extracting low-value products (softwood pulp and firewood) was greater than the income it would generate, and parts of trees were left in the woods as ecologically-beneficial woody debris. Although we don't have a direct comparison of income that would have been generated on these properties if different harvest methods were used, it is unlikely that our tractor/forwarder system yields a higher net income due to the extra time taken to minimize environmental impact.

Goal: Greater volume of forest products processed within the northern Vermont region, strengthening local economies and reducing environmental impact/cost associated with long-distance transport

Expected Outcome: At least 80 MBF sold to local mills or milled on-site in first year of project (volume to increase in following years)

Harvested products were either retained in northeastern Vermont for use as fuelwood or sold to local log yards. The harvest sites we completed during the grant period included a much lower volume of sawlog-quality wood than anticipated, reflecting the regional history of heavy logging and a current need for forest improvement harvesting. Approximately 14.5 MBF of hardwood and softwood sawlogs were sold to log yards in East Burke and Passumpsic, VT, and 49 cords of firewood were harvested for use within 30 miles of harvest site. Overall harvest volumes were lower than expected due to a short season and small-diameter forest stands; also because of the small/low-quality wood harvested, a much higher percentage of wood was firewood rather than sawlog quality. The goal of 80 MBF per year may be attainable in the next few years by working in higher value stands and conducting more summer harvests where conditions allow, or by adding staff. For harvests completed during the grant period, it was not feasible to track sawlogs to the mill they go to, but all firewood buyers are aware of where their wood came from and the sustainable harvesting practices used (34 cords were harvested for use by the landowner, requiring no trucking). Future market research will focus on finding local sawmills or alternate local markets (log home builders, on-site custom milling, etc.).

Goal: Increased landowner and consumer awareness of local wood supply chains through outreach programs and tracking of products from forest to retail

Expected Outcome: At least 20 landowners attending demonstration harvests and educational programs in 2014; 25% of sawlog volume from project labeled at retail with source location and harvest technique

A total of 24 landowners attended the 3 workshops hosted during the grant period, learning about the benefits of low-impact timber harvesting in the Northeast Kingdom. As described above, 4 firewood buyers will be heating homes with wood from local, sustainable sources and appreciate the benefits of reduced carbon footprint/cost and a stronger local economy. Although local milling/tracking of lumber products was not achieved in this grant period, local log yards benefited from adding sustainably harvested logs to their inventory and are aware of the low-impact harvest methods used.

Goal: Local forest industry jobs created by investing in human resources rather than large equipment

Expected Outcome: One part-time (possibly full-time by 2015) forwarder operator employed, funded by landowner service fees

This project generated 411 hours of employment (21% full-time employment, valued at $4,800 wages/$13,100 staffing cost) for NorthWoods staff. Cost for staffing was covered by timber sales and landowner fees. By investing $21,000 in equipment that should last 10 years or more, NorthWoods will be able to offer $10,000-$15,000 in wages per year in future employment.

Goal: Foresters, loggers and mill operators participating in sustainable, cost-effective harvests on small properties, achieved through demonstration and professional development programs

Expected Outcome: At least 10 regional loggers/foresters attending demonstration harvest programs

Few forestry professionals came to the 3 outreach programs, but many landowners who attended have small-scale equipment (tractor, winch, etc.) and actively work in their forests. The techniques and sustainability concepts presented in the workshops are very applicable to these landowners, who contribute to the Vermont working landscape by managing their own properties. With the prevalence of young or degraded forests in the Northeast Kingdom, improvement harvests/thinning may not be financially viable for a logger, but can be completed by a motivated and skilled landowner.

Beneficiaries

Landowners of 4 forested properties will benefit from the sustainable harvesting on their land, with increased future timber value and/or enhanced wildlife habitat. 2 of these landowners also obtained a total of 34 cords of firewood from their own property.

24 outreach program participants learned low-impact logging strategies to use in their own work, and will also be able to recognize sustainable practices on other logging jobs, promoting better forest health and productivity in the region.

2 log distribution yards had 14,500 board feet of sawlogs (valued at $2,700) added to their inventory, to be resold to sawmills.

2 log truckers were paid a total of $1,500 to transport sawlogs and firewood within northeastern Vermont.

Approximately 10 Northeast Kingdom residents will be using a total of 49 cords of firewood (valued at approximately $4,900) sourced from sustainable harvesting in local forests.

Lessons Learned

The greatest challenge in this project was to make timber harvests economically beneficial for everyone involved- the landowners, NorthWoods (as the logger and/or forester), and the log buyers. Forests in the Northeast Kingdom have historically (and often recently) been logged heavily, leaving few opportunities to sustainably harvest high-value trees. As a consequence, most current sustainable forestry is focused on removing low-quality and/or small-diameter trees, which generate less revenue for the amount of time required. This investment of time will pay for itself with increased timber value, but it could take 30 to 100 years for the forest to reach that stage. Over the course of the 4 harvests conducted during the grant period, we learned to more accurately estimate time, costs and product volumes for these stand improvement harvests, and found that operational costs (preparation, logging, trucking and administrative/overhead costs)

often exceeded product market value. In the long term, we hope that markets can place a higher value on forest products to support sustainable, stand-improving harvests. Until then, we will use information from these early projects to better assess potential future harvests, and may only be able to accept jobs in more mature/high-value forest stands unless other funding (landowner investment, NRCS cost-sharing, etc.) is available.

A more positive conclusion from the project was that timber harvesting can, in fact, be completed with much less environmental impact than current conventional systems. Use of permanent trails, minimal ground skidding and careful site selection/timing created very little residual damage, contributing to a more healthy and valuable future forest, and also to a better public opinion of forest management. As one of our clients said,

> "*I was up on Sunday checking everything out. It looks wonderful. I especially like the last of your patch cuts. Perfectly done. The area is now so attractive that it draws me up to it. Great wildlife habitat… Thanks for all you have done, and for finding a way to make this work our financially for us.*"

Initially we were concerned about finding enthusiastic landowners to work with, but we have since been contacted by several potential clients and will likely be able to refer work to other local loggers in the future.

Press Release

With funding from the Working Lands Enterprise Initiative, the NorthWoods Stewardship Center purchased a 5-ton capacity forwarding trailer for use in low-impact timber harvests. In the first year, we worked in the NorthWoods demonstration forest and with three other Northeast Kingdom landowners to complete timber stand and wildlife habitat improvement projects. Through public outreach events, we were able to share with many participants our strategies for harvesting timber in Vermont's working landscape while protecting its ecology and long-term economic value. Sustainable harvesting in the first year of the grant contributed 49 cords of firewood, 14.5 MBF of sawlogs and over 10 weeks of employment to the regional economy; we expect to increase productivity and help build strong forest product markets in future years.

Additional Information

- NorthWoods low-impact timber harvesting promotional brochure *(attached)*

Photos

Forwarding logs on packed-snow trails. This red pine/ Norway spruce plantation located near the East Branch Nulhegan River has sensitive soils, and restoring ecological function is a primary landowner goal. Harvesting in winter with light-weight equipment left minimal post-harvest soil disturbance.

Loading small-diameter spruce logs during a plantation thinning demonstration at NorthWoods. Small forwarding equipment is ideal for working in dense stands such as this, where the articulated steering axle and ability to maneuver logs between trees minimizes damage to growing stock.

Winching logs to a trail during a plantation thinning demonstration at NorthWoods while a program participant watches. By winching logs 50-100 feet to a trail where they'll be collected with the forwarder (rather than driving to each log), area of soil compaction and damage to understory plants is greatly reduced.

Discussing how to maximize log value during a NorthWoods outreach program. Many of these landowners are active in their own forests, and learned techiniques for working around timber defects to produce high-value logs while harvesting less-than-perfect trees.

Harvesting fuelwood during a crop tree release thinning in the NorthWoods forest. Smaller trees or those with timber defects were removed to allow more growing space for high-quality trees such as the two yellow birches in the foreground of this photo.