

## Conservation Discussions

### Woodland Restoration Case Study – The Peterson Farm Big Woods

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#### Introduction / Resource Setting

The Peterson Farm is situated in Hennepin County near Delano, Minnesota. The farm was purchased by the Peterson family in 1899 and the 25 acre woods was likely used for grazing cattle since settlement. In 1963 cows were no longer grazed in the woods and the tree seedlings started to survive. In the 1970s Red Pine, Black Walnut, and Green Ash were planted in pasture areas. John and Mary moved to the farm in 1980, built their house, and began some tree planting and thinning. They harvested dead trees for firewood. They referred to this as “casual” management because they started with no real knowledge on how to care for a forest.

Between 2005 and 2007 they recognized there was a lot of buckthorn on the property and began removal by cutting larger plants without stump treatment and began foliar spraying on smaller plants. As John and Mary proceeded they joined the Minnesota Forest Association (MFA) in 2008 and began attending woodland management classes. They soon realized the “strange weed” they had wondered about for some time was garlic mustard. The Petersons got more information about effective removal methods and started a systematic approach to removal of buckthorn and garlic mustard as part of a plan for removal of invasive species and forest stand improvement for their land. They began transplanting native hardwood trees using wire fencing to protect them from deer damage in about 2008. Beaver damage was addressed with welded wire tree protection and trapping.

Their goals for the property are a healthy woods which means bigger and restoration to more of a “virgin stand” condition that will be more resistant to drought and climate change. The ascetic value of the woods is an important part of these goals.

The inventory of the tree species identified the following tree species on the site: Sugar Maple, Basswood, Bitternut Hickory, Ironwood, Black Cherry, Burr Oak, Northern Red Oak, White Oak (1 tree), Butternut (dying off), American Elm, Red Elm, Green Ash, Hackberry, Eastern Red Cedar, Cottonwood, Red Pine, Spruce, Black Walnut, and Rock Elm. The invasive plant species inventory includes 26 plants with buckthorn and garlic mustard being the top ones for action at the beginning.

#### Turning Points

The removal of buckthorn began in 2007 when it was identified and they realized they had a lot of it. In 2008 garlic mustard was identified and they began removal around three sites as well as applying an improved treatment for removal of buckthorn. The meetings they attended and knowledge gained about how buckthorn can destroy a woodland gave them a great sense of urgency. The first turning point began with a trip to the Aldo Leopold Foundation in Baraboo, WI where they met with Site Ecologist Steve Swenson and got professional guidance that helped them with scouting and evaluation. Steve told them there would be a turning point on the progress as they had a better understanding and implemented improved the timing and actions on the sites. It took into the 4<sup>th</sup> year to see the progress turn from crisis mode to routine management. In 2010 along with the continued work on buckthorn and garlic mustard they began a massive effort to remove Canada thistle as well as beginning removal of honeysuckle and

reed canary grass. They also began brush pile removal and site prep to return the woods to natural conditions.

The second turning point was the transition to seeding and planting along with thinning to move towards the “bigger woods” goal. Transplanting trees with tree protection is done using wire fencing to protect them from deer damage greatly improves survival. Recently beaver damage was addressed with welded wire tree protection and trapping. White Oak acorns are also being planted. They continued the ongoing process of buckthorn, garlic mustard and canada thistle as well as brush piles and other junk and debris removal from the woods. In 2011 they began to focus on thinning of hardwoods (Forest Stand Improvement) and transplanting native trees. In 2012 they added removal of some other invasive plants and in 2013 began to seed sites with Fescues to suppress the garlic mustard. Also Mary began to focus on missouri gooseberry removal. By 2014 the buckthorn removal was winding down to 99% hand pulling seedlings. In 2014 to present there is continued scouting & mapping garlic mustard sites for removal treatment and additional work was done for removal of yellow foxtail and hairy vetch. Ongoing inventory includes 26 invasive species plants that have been identified with actions for removal.

Other guidance learned from this work include learning the best time to begin spring garlic mustard scouting based on weather and conditions and to scout for missed adult garlic mustard in the spring before the grass gets green so they are easier to spot and start carrying along Preen to apply to areas where juveniles are likely to grow. They also recommend early in the year, scouting for adult garlic mustard plants should have priority over all activities and it should be done almost daily until end of June and replace flags regularly so sites are not missed. They also do scouting while out doing timber stand improvement activities. When cutting trees or limbs for firewood, they perform needed Forest Stand Improvement in the area and remove any invasive plants. They remove or burn limbs and tops and any brush removed. One important aspect for successful removal of invasive species is to learn the best methods and timing for each type of invasive being removed.

### **Continuing Evolutions**

Management is being done with the goal of improving the woods. Improvement efforts include ongoing actions to transplant trees, direct seeding White Oak acorns, and protection of young trees from deer damage. The tree inventory includes 19 tree species with the current focus on Sugar Maple, Basswood, Bitternut Hickory, Ironwood, Burr Oak, Northern Red Oak and White Oak.

The invasive species inventory includes 26 plants that have been identified with actions for removal. Garlic mustard sites are identified and removal continues with grass seeding some sites to suppress the germination of garlic mustard seedlings. Improved scouting methods and scouting many times during the season continues.

Ongoing work includes working with adjoining property owners as part of the control of invasive plants.

The present day actions are focused on the objective of “making it better all the time”. The plan is not only maintenance, but improving the woods. They tap maple trees for maple syrup for personal use and use some wood in the wood shop for furniture as an “enjoyable hobby” as they continue their focus on “leaving it much better than they got it.”

### **Investment in Woodland Restoration**

There are some capital expenses needed to be successful with the removal of invasive species and improve a woods. Table 1 Capital Investment for Restoration shows the initial purchase cost and an

amortized to an annual cost over the expected useful life of the equipment. In addition to tools for field work, keeping records of sites, scouting and treatments is important to ongoing management for successful restoration. Aerial view maps are critical for site identification and monitoring as is a tablet or smart phone for taking field notes. The computer with spreadsheet software is another essentially useful tool for keeping records. Some aerial maps may be downloaded on line without cost.

Basic Equipment (listed in Table 1 Capital Investment for Restoration) is what is recommended based on the equipment used on The Peterson Farm. The Petersons did not have to buy all the equipment for this woodland as they already owned a lot of the tools and equipment needed. The prices for the cost of the capital investment in Table 1 were gathered from prices at nearby suppliers in Minnesota. includes a 4-wheeler set up with a tool box used to get to sites, chainsaws, and other hand tools which typically cost a little over \$13,600 with an additional \$1,160 for construction of a trail to access sites makes a total capital investment of \$14,710. Other equipment that is nice to include is a trailer the 4-wheeler can tow for hauling materials thinned and removed and additional backpack sprayers so a sprayer can be dedicated to a spray product which saves cleaning labor time when changing from one product to another. Some of this equipment may already be available on hand and not need to be purchased to get started with woodland restoration. Some trails already existed, so the cost for trails is based on what typical trails might cost for this size of woodland. Prices for equipment are based on the Peterson's estimates and current prices from local suppliers.

Annual operation expenses include: burn permits and supplies for burning for sites where brush burning is needed, marking flags, chemicals, fuel and repairs for equipment. Operation costs and equipment purchased totaled \$6,765 with chemicals being most cost at \$3,745. Some of these costs were covered by the \$2,795 received in 2011 for program participation. Not all the costs for operations and maintenance for the 4 wheeler and chainsaws were captured for the earlier years. Table 2 Total Costs Each Year shows the hours, operational expenses and purchase of two chainsaws and a backpack sprayer. Most of the tools and equipment were already owned and on site for this operation. The amount of equipment needed and the hours can vary from year to year depending on the site.

The labor hours ranged from 108 to 1136 per year with an average of 544 hours per year. These hours are only the ones they tracked. Because they improved tracking labor hours over the years some of the earlier years records did not capture all of the time they worked on the woodland. Total expenses plus the value of labor were \$58,393. The value of the labor is 95% of the total costs. Valuing the labor at \$10 per hour the 25 acres had \$54,423 worth of labor invested over the 10 years. This was an average of \$2,177 worth of labor time per acre.

<b>Equipment</b>	<b>Cost</b>	<b>Lifespan</b>	<b>Rate</b>	<b>Annualized Cost (amortized)</b>
Four-wheeler with winch & toolbox	\$ 10,000	15	2.1%	\$784
Chainsaw larger	\$ 720	5	2.1%	\$153
Chainsaw smaller	\$ 630	5	2.1%	\$134
Cant Hook	\$ 60	20	2.1%	\$4
Protective Equipment	\$ 275	3	2.1%	\$96
Lopping Shear	\$ 40	5	2.1%	\$9
Pruning Shear	\$ 50	5	2.1%	\$11
Folding Saw - small	\$ 30	5	2.1%	\$6
Backpack sprayer (2 for Roundup & 24D)	\$ 200	5	2.1%	\$43
Metal Fence post maul or post driver	\$ 25	15	2.1%	\$2
Shovel or ditch spade	\$ 30	10	2.1%	\$3
Small hand digging tool (Dandelion digger)	\$ 10	5	2.1%	\$2
Hand seed spreader	\$ 20	5	2.1%	\$4
Hand tools for ground preparation for seeding	\$ 60	10	2.1%	\$7
Computer & spreadsheet software	\$ 1,200	5	2.1%	\$255
Phone / notepad for field notes	\$ 200	5	2.1%	\$43
Arial View Maps		5	2.1%	\$0
Construction of Trails	\$ 1,160	5	2.1%	\$247
<b>Sum Initial Capital Expenses</b>	<b>\$ 14,710</b>			<b>\$ 1,803</b>

	<b>Labor Hours</b>	<b>Expenses</b>	<b>Equipment Purchases</b>
2008	108	\$766.00	
2009	302	\$780.00	
2010	800	\$1,291.95	
2011	574	\$544.50	\$500.00
2012	245	\$90.80	\$100.00
2013	339	\$208.00	
2014	557	\$495.00	
2015	1136	\$313.00	
2016	866	\$637.00	
2017*	516	\$412.00	\$627.00
Total	5442	\$5,538.25	\$1,227.00
*part of year through September			

## Closing Thoughts

It is possible to take a woods from a cow pasture to more virgin stand look. The future look can be a healthy stand with a diversity of trees. This is the story of 10 years of work in an ongoing restoration of the woods.

First the removal of buckthorn and garlic mustard were the highest priority as they were the high population invasive plants. In addition dump sites are being removed and restored to a native woodland (a lot of farms in days gone by used the woods for a dump site). The next step was the transformation towards restoration of the woods through Forest Stand Improvement and transplanting native trees.

The woods provides the family with wood for heating their home and making maple syrup. They enjoy the woods for its recreation and ascetic views, including a beautiful site where they put up a tipi for some rest and relaxation time.

Forest Stand Improvement is a conservation practice that can take time to see the results and for this site is a long term ongoing process. The right tools and timing are critical to successful removal and follow-up to keep invasive plants out. They have hosted tours of the woods and have participated in assisting other landowners manage invasive species by sharing what they have learned and applied on their land. The family has made the effort to prioritize the time needed to be successful in the continuing loving care of this woods. The actions taken and treatment to this site have a positive long term impact on the economic value of the timber and real estate value. John wrapped up his philosophy for woodland when he said “making it better all the time”.