



# Prescribed Grazing (Goat) Project

## Final Report Covering Years 2014, 2015, and 2016

at Gamehaven, Eden Acres, and RiverBend Nature Center

June 5, 2017

Prepared For  
Hiawatha Valley Resource Conservation and Development



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WSB Project No. 02791-00

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**For:**

**Hiawatha Valley Resource Conservation and Development**

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## Executive Summary

The Hiawatha Valley Resource Conservation and Development Council, Inc., (HVRCD) as part of its mission, began implementation of a program to control terrestrial invasive species using alternative biological control methods. The alternative biological control method used goats to graze undesirable vegetation rather than using herbicides or mechanical methods such as mowing, prescribed burning, cutting, etc.

HVRCD began a pilot project in 2011 with the help of the United States Department of Agriculture-Natural Resource Conservation Service (USDA-NRCS) to develop a baseline inventory of vegetative characteristics of selected sites and document the effects of grazing on terrestrial invasive species to determine the efficacy of grazing as a control technique.

In 2013 HVRCD received funding through the Environmental and Natural Resources Trust Fund (ENRTF) Legislative-Citizen Commission on Minnesota Resources (LCCMR). The project goals for ENTRF funds are:

(1) develop a cost effective and environmentally friendly alternative to chemical and mechanical control methods for these species, (2) demonstrate that multi-species grazing techniques can be used effectively to control invasive plants, (3) distribute results during field day demonstrations to connect livestock producers with landowners and (4) develop a Best Management Practice for invasive species control using grazing management as a component.

Three sites were selected as part of this project; Gamehaven Scout Reservation, approximately 10 miles southeast of the City of Rochester; River Bend Nature Center in the City of Faribault; and the property of the grazer, Eden Acres, roughly 5.4 miles southeast of the City of Faribault.

Results show little change in seasonal buckthorn sapling density, an increase in buckthorn seedlings, and variable results for adult buckthorn mortality. However, result show a change in the vertical composition or morphological stage of buckthorn within treatment areas as fewer live adult and large saplings were documented within the treatment sites.

Saplings are defined as individual buckthorn 3”-36” in height, seedlings are below 3” in height, and adults are all buckthorn taller than 36”.

Garlic mustard density was dramatically reduced in two growing seasons at the RiverBend site, showing a 94% decrease in density by 2016.

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## Site Description

The Gamehaven Boy Scout Ranch is a 262-acre parcel in Section 31, Township 106, Range 13 in Rochester, Minnesota. Twelve plots were originally identified as potential grazing sites. Of the 12 potential sites, six were chosen based on accessibility, proximity to a water supply, and the presence of invasive species. Out of the six plots chosen, Plots 1 through 5 received monitoring. The 7.6-acre Plot 1 was used for targeted grazing after 2011, where three transects (6-1, 6-2, and 6-3) were established.

Six plots were originally chosen in 2011 for monitoring buckthorn and wild parsnip at the Gamehaven Boy Scout Ranch. Following the first year of grazing, the scope of the project was limited to buckthorn monitoring in a single plot, which was completed on May 19, 2015. This concluded the monitoring at Gamehaven Boy Scout Ranch.

River Bend Nature Center consists of 731 acres of forest, prairie, wetlands, and the Straight River in Sections 31, 32, and 33 of Township 110N, Range 20W and Sections 4, 5, and 6, of Township 109N, Range 20W, in Faribault, Rice County, Minnesota. Three sites were identified for grazing purposes in 2014: a prairie sweet clover plot, a forested buckthorn plot, and a forested garlic mustard plot. The River Bend plots received grazing treatments in 2015. One transect was established for each plot in 2015 (**Figure 3, Appendix A**). In 2016 sweet clover did not return on this plot and no grazing occurred, so two (2) transects were established within the buckthorn grazing area and one (1) transect was established as a control in an area that was previously treated mechanically (prescribed burn). For garlic mustard, two (2) transects were established within a grazing area, and one (1) was left as a control.

Eden Acres consists of 10 acres of forested, wetland, and residential land in Sections 10 and 15, of Township 110N, Range 20W, in Faribault, Rice County, Minnesota. Seven plots were established for buckthorn grazing purposes in 2014 (**Figure 4, Appendix A**). Grazing efforts continued in 2015 and 2016, but in 2016, only six (6) transects were surveyed since grazing did not occur throughout the site as in previous years.

The Eden Acres site contains seven transects, which were established in early 2014. The transect locations were established to collect data on different goat grazing intensities within separate goat paddock areas. In 2016, only five (5) of the seven (7) transects were grazed (a prescribed burn was carried out in one transect) and six (6) of the seven (7) were surveyed for buckthorn density.

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## Species of Concern

The project area contains multiple terrestrial invasive species, but monitoring was limited to buckthorn, wild parsnip, sweet clover, and garlic mustard.

**Table 1: Species of Concern**

Site	Species
River Bend Nature Center	Buckthorn ( <i>Rhamnus cathartica</i> ), Garlic Mustard ( <i>Alliaria petiolata</i> ), Wild Parsnip ( <i>Pastinaca sativa</i> ), Sweet Clover ( <i>Melilotus alba</i> )
Eden Acres	Buckthorn ( <i>Rhamnus cathartica</i> )
Gamehaven	Buckthorn ( <i>Rhamnus cathartica</i> ), Wild Parsnip ( <i>Pastinaca sativa</i> )



Buckthorn is known for having an extended growing season, often leafing out early in spring, and continuing to hold leaves until late autumn and being a prolific seeder. Once buckthorn plants reach three to four years of age, it begins to produce fruit. Seeds are dispersed through bird droppings and are viable in the soil for an average of six years, allowing buckthorn to quickly colonize an area with open canopy and few competitors. When heavily damaged or cut down, buckthorn readily sprouts from the base of the trunk, unless treated with herbicide.

Garlic mustard is a biennial herbaceous plant. It is often found invading high quality woodlands, upland, and floodplain forests. It appears as a single stemmed, one to three-foot-tall plant with scallop-edged leaves and numerous small white flowers.





Sweet Clover has the potential to invade high quality grasslands and reduce the ecological integrity by developing into a monotypic stand; reducing vegetative diversity. Sweet clover provides little ecological benefit and can displace other native herbaceous plants that have high coefficients of conservatism.

Wild Parsnip is a perennial invasive plant that is considered a prohibited noxious weed by the Minnesota Department of Agriculture. Skin contact can cause a rash and skin blistering similar to a burn.



Source: DR Blog

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## Methodology

Previous surveys to monitor grazing success used transect methodology to record data for buckthorn, sweet clover, and wild parsnip. The number of individual plants encountered were recorded and divided into two categories; above and below waist height. In 2014, six transects were completed on the Eden Acres site, one on the Riverbend site, and three at the Gamehaven site. Each of these transects recorded data on buckthorn. The Riverbend transect recorded data on both buckthorn and sweet clover.

To accomplish project goals, we established several transects within each of the study sites. Seven transects were established at Eden Acres and three transects were established at River Bend Nature Center. Transect locations were based on survey work completed in those locations in previous years; areas which had previously been divided up into paddocks where goats were rotated into and out of the plot areas. The seven transects located at Eden Acres are labeled 1-7, but transect 5 does not exist. This is a carryover from some of the original survey work completed here. Transects at Riverbend Nature Center were located based on cover types of buckthorn and garlic mustard. Transects were also located in areas that were representative of the project site and grazing areas.

Transects were 100 feet in length. Data was collected by first establishing a starting point for the transect, then measuring 100 feet using a 100-foot tape measure reel. These two points were demarcated with pink flagging and recorded using a sub-meter accuracy GPS unit. A photo was taken at the both the beginning and endpoint of each transect to document survey conditions and surrounding vegetative cover.

Once established, the transect was surveyed by walking the length and tallying the number of buckthorn stems that were alive or dead. In addition to plant condition, we recorded data on the height of the stems by dividing them into three categories: seedling, sapling, or adult. Individual buckthorn plants less than three inches were recorded as seedlings, buckthorn greater than three inches to less than three feet were identified as sapling, and buckthorn larger than three feet were recorded as adults. Using these two metrics, we could then calculate the total number of stems per transect. In 2016, alternate methodology was used to complete buckthorn counts within the grazing areas for transects #2 and #3 as there was an extremely high number of stems that had sprouted from adult buckthorn trees that had been flush cut at a height of 1-2 feet. For Transect #2, the seedlings and saplings were counted along a 50 foot length of the original 100-foot-long transect and total # of stems were calculated by multiplying the number of stems counted in the field by 2. Transect 3, included a larger number of sprouts from the cut adult buckthorn. Therefore, stems for saplings and seedling were counted along a 4-foot length of the transect, so field counts were multiplied by 25 to get the number of stems per 100 feet to compare to the previous year's survey. Adult buckthorn were counted along 20 feet of the transect, so field counts were multiplied by 5 to get the total number of stems along the 100 feet of transect #3.



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Transect surveys are completed three times in 2016 for buckthorn at both River Bend Nature Center and Eden acres, once in the spring before heavy grazing commences once during mid-summer, and once during the fall when other plant species may be senescing making buckthorn easier to identify and to document the response of grazing intensity over the summer. Garlic mustard was surveyed twice in 2016 at River Bend Nature Center, once in early May and once in mid-July.

An alternate methodology that had been used previously proposed for the Eden Acres site is the establishment of a 0.1-acre plot. Live, dead, girdled, and sprouting/sprouting buckthorn stems were to be counted within each macroplot. As soon as full understory canopy emerged (spring period), all available browse was to be clipped starting at the maximum height that goats could browse down to the ground. The extent that goats could remove twigs was to be observed and replicated in the macroplot clippings. Each species was to be clipped separately, dried, and weighed to determine the amount of dry matter per acre each species contributed. While providing more quantitative data for analysis, we did not employ this method due to budgetary and time constraints. The proposed transect methodology provides sufficient data to achieve the two goals outline in the introduction of this document.

## Results

### GameHaven Boy Scout Ranch

HVRCD and its partners began collecting data both buckthorn and wild parsnip and implementing prescribed grazing on the Gamehaven site in 2011. Six (6) plots were delineated throughout the project area. Five (5) of the six plots contained one transect, while the sixth plot contained three separate transects. Methodology was similar to that described above for this project, except that “canopy hits” were counted along the 100 foot transect converted to a percentage. For wild parsnip, the canopy hits were segregated into both flowering and rosette stage. Data collected between 2011 and 2012 showed a little change in buckthorn canopy hits between the two years. In fact, buckthorn canopy hits increased by 5% across the three transects between 2011 and 2012.

In August 2014, WSB staff replicated transect counts for buckthorn along the three original transects established in 2011 for plot #6 and again in May 2015. Buckthorn density appears to have increased since the original baseline survey and grazing implemented in 2011. Data from 2011, 2012, 2014, and 2015 is displayed in tabular and graphical format below.

Table 2. Gamehaven Buckthorn Survey Results (Canopy Hits and stems/transect)

	Number of Occurrences			
Transect	6/23/2011	4/10/2012	8/15/2014	5/19/2015
6-1	76	99	75	73
6-2	37	37	33	88
6-3	37	29	50	86

Figure 1. Gamehaven Buckthorn Survey Results (Canopy Hits and stems/transect)

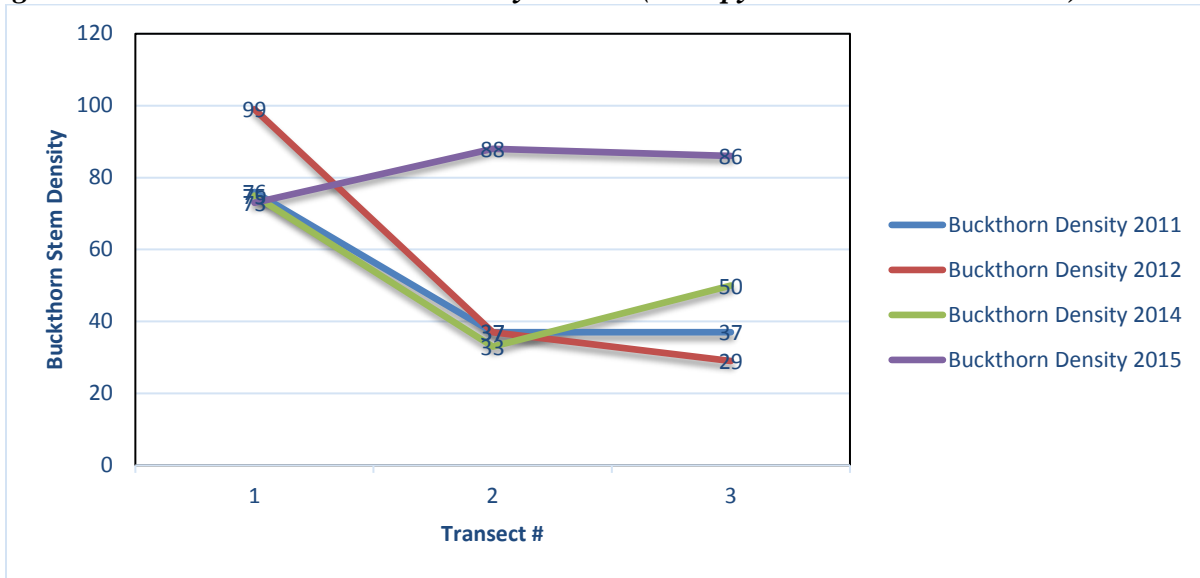
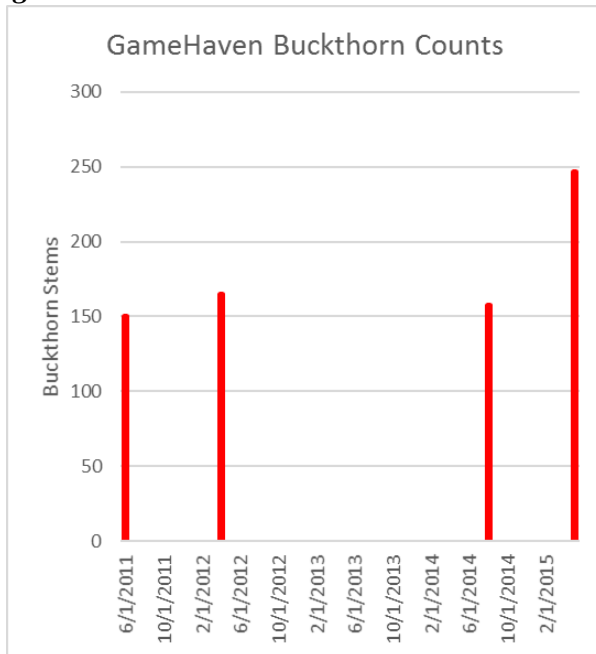


Figure 2. Gamehaven Total Buckthorn Counts Across all Three Transects



Previous reports indicate that grazing had been completed in 2011 and 2012. In 2011, 103 goats grazed plot 6, while in 2012 76 goats grazed. Grazing continued in 2013 and 2014, but no quantifiable data is available. The absence of goats in 2015 may have been the reason for a marked increase in total buckthorn density across all three transect as shown in Figure 2.

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Wild parsnip appears to have responded to 2011 grazing as coverage decreased from 23.5% in plot 2 to 2.43% in 2012.

### River Bend Nature Center

Transect surveys were completed for garlic mustard, sweet clover, and buckthorn in 2015 and garlic mustard and buckthorn in 2016. The sweet clover site was not grazed in 2016 and therefore not surveyed.

In 2015, one buckthorn transect was established and surveyed to establish a baseline density for buckthorn. The survey documented 199 individual buckthorn stems along the transect. No grazing was completed along this transect in 2015. In 2016, this transect was kept as a control (transect #1), and two (2) additional transect were established inside the goat grazing area. The area was grazed between June 23 and July 10, then again from July 30 to August 13. Three individual surveys were completed to document the effects of grazing on buckthorn density and distribution.



The control transects established in 2015, showed an initial increase in buckthorn stem density from 199 stems in 2015 to 438 stems during the May 4<sup>th</sup> survey. Stem density decreased over the growing season from 438 stems/100 foot transect to 197 stems by the October survey. This may be due to self-thinning as seedlings counted in the spring survey developed and outcompeted each other during the growing season.

Buckthorn increased dramatically along transect 3 within the grazing area. The initial count along transect 3 resulted in 232 stems. By October this number had increased to 1,485; a 640% increase. Transect 2, initially decreased during the grazing period from 201 stems/100 foot transect to 181, but then increased by the end of the growing season in October to 244. The increase may be due to stump cutting the buckthorn. This resulted in a massive sprouting response by sapling and adult buckthorn. What would have been counted as one (1) sapling or adult before being cut, was counted as 20-50 stems per cut tree in the October survey. Based on this, survey results may not be reflective of the efficacy of the goat grazing.

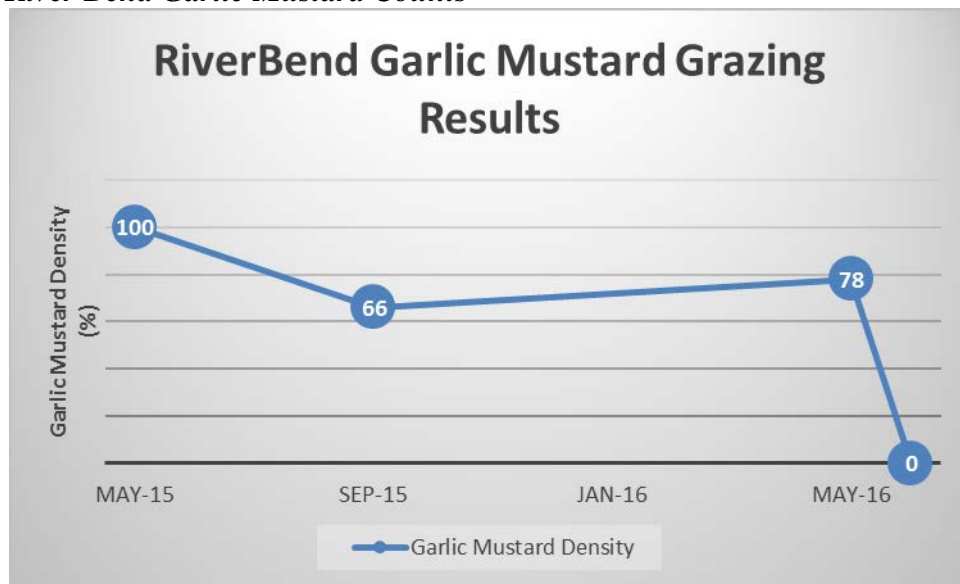
Goat grazing intensity was 102 goat grazing days (6 goats x 17 grazing days) by the second survey period. Goat grazing intensity increased to 186 goat grazing days by the third period (6 goats x 31 goat grazing days). Goats did not graze beyond August 13, 2016 resulting in a 76-day period before the third survey where goats were not present. This may have allowed additional sprouting and growth by buckthorn within the paddock.

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Grazing effects on garlic mustard were documented in one grazing area (paddock) on Riverbend Nature Center. In 2015 one (1) transect was established and surveyed twice, once on May 19, and again on September 30. Garlic mustard canopy coverage decreased from 100% coverage in May 2015 to 66% coverage by the September 30 survey; a 34% decline. In 2016, two transects were established in the same area as transect 1 from 2015, and a third transect was established as a control outside of the paddock from 2015. This transect was eventually grazed as well.

By spring 2016 garlic mustard density was documented at 78% and 64% along transect 1 and 2, which corresponded to transect 1 from 2015. It appears garlic mustard density had remained close to the same density as was surveyed in the September 2015 survey period. By the second survey on June 30, 2016, garlic mustard had decreased to 0% and 5% along transects 1 and 2; a 96% decrease on average. Similar results were recorded for transect 3 which decreased from 58% in the May 2016 survey to 5% by the June 30, 2016 survey. It should be noted that the area that transect #3 was located in was also grazed in 2015 which may have been responsible for the initially low garlic mustard density of 58%. Average reduction for garlic mustard over all transects in 2016 was 94%.

**Figure 3. River Bend Garlic Mustard Counts**



The reduction in garlic mustard was consistent even though grazing intensity was quite variable in 2016. For both transects 1 and 2, 23 goats grazed for 5 days (115 goat grazing days). Transect 3 was originally set up to be a control and not support any grazing activities; however, 23 goats grazed this site for 19 days (437 goat grazing days) in 2016.

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## Eden Acres

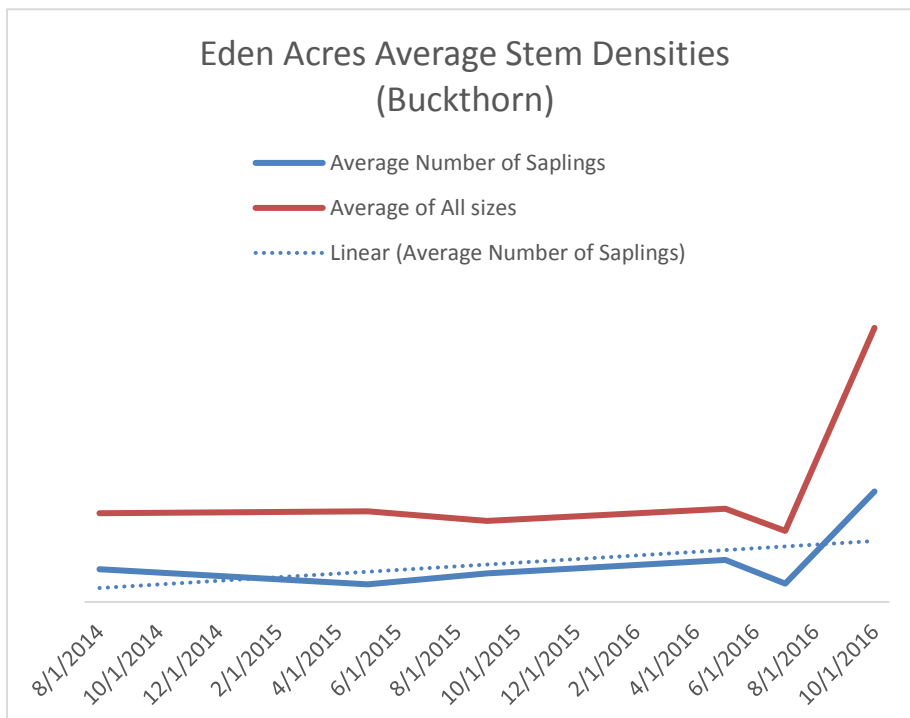
Field data was limited to buckthorn on the Eden Acres site; no data was collected on other invasive species at Eden Acres.

Buckthorn surveys were completed in 2014, 2015, and 2016 on Eden Acres. The 2014 data was collected using a slightly different methodology, but is useful for comparison. Only one survey was completed in 2014, so we will consider that a baseline year, since no other pre-grazing data is available for comparison.

In 2014, an average of 36 buckthorn stems were counted along the transect across all seven (7) transects. This includes seedling, saplings, and adults. When the data is filtered to look specifically at just saplings, the number drops to 13 stems/transect.

In 2015, an average of 35 stems were counted per transect and when filtered for saplings that number again drops to 9.5 stems/transect.

**Figure 4. Eden Acres Buckthorn Stem Densities**



By 2016 the average number of stems/transect increased to 59 stems/transect, and when filtered for saplings the number was 23 stems/transect. It should be noted that the October 2016 survey greatly increased the average number of stems for both saplings and seedlings. This may be reflective of grazing periods, as in 2014 and 2015 grazing was completed by early September, with the most intense grazing occurring in early to mid-summer.

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Grazing intensity varied by year as well. To calculate grazing intensity, we multiplied the number of grazing days by the number of goats that were grazing to determine goat grazing days.

In 2014, the average number of days grazed across transects was 15 with 44 goats giving us 664 goat grazing days. In 2015, the number of grazing days and goat dropped as there were only 15 grazing days with 30 goats resulting in 412 grazing days. In 2016, most of Eden acres was considered one paddock as goats were pastured throughout the summer across the entire acreage. Also, the number of goats ranged from 2-23 with no specific corresponding grazing dates were kept. For this reason, we average the number of goats across the entire grazing period and considered the entire growing season the grazing period (6/12/16 to 10/26/16). This gave us an average of 12.5 goats grazing for 103 days or 920 grazing days. While this shows a higher intensity, the density of goats was not as high as in previous years as they were given most of the property to graze on.

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## Discussion

A review of the data shows that goat grazing may be most effective in controlling garlic mustard as transect counts showed a 94% decrease in coverage over the two-year monitoring period (2015 and 2016).

A review of buckthorn data from 2012-2016 across all three sites did show significant decrease in buckthorn density. Riverbend data from 2015 and 2016 may have been influenced by stump cutting and sprouting. Also, the density of goats within the paddocks may play a role in the frequency of buckthorn across the transects. The higher number of buckthorn stems is mainly attributed to seedlings. What may be effective is to combine grazing in the early to middle part of the growing season with a fall application of herbicide (such as glyphosate) to the seedlings or a prescribed burn, as the goats are not grazing plants lower than 12 inches (observed by herd owner).

Eden Acres displayed a slight increase in buckthorn stem density between 2014 and 2016. When the October 2016 survey data is not included, buckthorn density is relatively flat showing little change in density. However, as stated above, much of the buckthorn growth can be attributed to seedlings rather than large saplings or adult buckthorn.

In plots with increased buckthorn frequency, there were less buckthorn plants prior to or early on in grazing efforts in 2016. When visiting the site in October 2016, the majority of buckthorn plants in these plots were seedlings or saplings. It appears that goats were effective in removing the adult buckthorn plants, and the increase in buckthorn frequency may be attributed to sprouts in response to sudden canopy openings. The reduction in buckthorn frequency over time compared with the Gamehaven site's increase may be attributed to more frequent grazing by goats, as Eden Acres is home to both the goats and the grazer. This suggests that goat grazing may be more effective in removing buckthorn when frequent grazing is applied.

The project sites showed a shift in understory composition due to a decrease in adult and large sized sapling buckthorn since the project began in 2014. A decrease in canopy density may have allowed more sunlight to penetrate to the forest floor and support native grass, sedge, and forb growth. This growth and increase in diversity was not tracked as a part of this project, but would be beneficial to document as part of a future project involving prescribed grazing.

This shift in composition also provides easier access to the project sites for alternative control methods and data collection.

A follow up project to gather additional information on changes in floristic quality, overall biomass density, and grazing animal metrics (weight, health, etc.) would be very useful to resource managers and livestock producers to further develop a prescribed grazing program.

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Additional data collection on grazing intensity (goat days) compared to vegetative biomass and a functional assessment of the vegetative community over a longer period of time and involving more sites would provide a robust dataset where resource managers and producers could develop specific programmatic guidance to use as part of an integrated pest management plan for multiple terrestrial invasive species.



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## **APPENDIX A**

Figure 1a: River Bend Site Location

Figure 1b: Eden Acres Site Location

Figure 2: River Bend Transects

Figure 3: Eden Acres Transects

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**APPENDIX B**  
Photos



**Transect 3, Riverbend, May 2016**



**Transect 3, Riverbend, May 2015**



**Transect 3, Riverbend, October 2016**



Garlic Mustard Transect 1 at Riverbend in May 2016



Eden Acres Transect 6, 2014



Eden Acres Transect 6, 2015



Eden Acres Transect 6, 2016



Gamehaven 2015, No grazing





Eden Acres Goats, 2015

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**Typical Goat Enclosure (September 2011)**



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**Appendix C**  
Site Data

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### River Bend Garlic Mustard Data

Transect	Visit Date	Garlic Mustard %	Grazed or Control	Number of Goats	Days Grazed	Grazing Days	Dates Grazed
1	5/4/2016	78	Not Grazed	0	0	0	Grazing didn't start until 5-8-16
2	5/4/2016	64	Not Grazed	0	0	0	Grazing didn't start until 5-8-16
3	5/4/2016	58	Control	0	0	0	Grazing didn't start until 5-8-16
1	6/30/2016	0	Grazed	23	5	115	Grazing from 5-8 until 5-12-16
2	6/30/2016	5	Grazed	23	5	115	Grazing from 5-8 until 5-12-16
3	6/30/2016	5	Grazed	23	19	437	Grazing from 5-12-16 until 5-31-16

### River Bend Buckthorn Data

Transect	Date Measured	Total Buckthorn			Seedlings			Sapling			Adult			Number of Goats	Duration of Grazing (days)	Grazing Intensity (goat days)	Date of Grazing
		Total	Living	Dead	Total	Living	Dead	Total	Living	Dead	Total	Living	Dead				
1	5/4/2016	438	418	20	231	231	0	186	176	10	21	11	10	0	0	0	No Grazing
2	5/4/2016	201	173	28	66	66	0	112	97	15	23	10	13	0	0	0	pre graze
3	5/4/2016	232	231	1	156	156	0	75	74	1	1	1	0	0	0	0	pre graze
1	7/15/2016	259	259	0	96	96	0	91	91	0	72	72	0	0	0	0	No Grazing
2	7/15/2016	181	177	4	94	94	0	69	69	0	18	14	4	6	17	102	6-23-16 to 7-10-16 and 7-30-16 to 8-13-16
3	7/15/2016	340	340	0	178	178	0	111	111	0	51	51	0	6	17	102	6-23-16 to 7-10-16 and 7-30-16 to 8-13-16
1	10/26/2016	197	181	16	51	51	0	145	130	15	1	0	1	0	0	0	No Grazing
2	10/26/2016	244	238	6	108	108	0	130	130	0	6	0	6	6	31	186	6-23-16 to 7-10-16 and 7-30-16 to 8-13-16
3	10/26/2016	1485	1475	10	1000	1,000	0	475	475	0	10	0	10	6	31	186	6-23-16 to 7-10-16 and 7-30-16 to 8-13-16

## Eden Acres Buckthorn Data

Transect	Date Measured	Total Buckthorn			Seedlings			Sapling			Adult			Goat Area	Number of Goats	Duration of Grazing (days)	Grazing Intensity (goat days)	Date of Grazing
		Total	Living	Dead	Total	Living	Dead	Total	Living	Dead	Total	Living	Dead					
1	5/4/2015	7	7	0	5	5	0	2	2	0	0	0	0	10.4	0	0	0	N/A
2	5/4/2015													10.4	0	0	0	N/A
3	5/4/2015	94	87	7	45	45	0	38	38	0	11	4	7	10.4	0	0	0	N/A
4	5/4/2015	16	9	7	0	0	0	7	4	3	9	5	4	10.4	0	0	0	N/A
6	5/4/2015	64	62	2	22	22	0	36	36	0	6	4	2	10.4	0	0	0	N/A
7	5/4/2015	44	40	4	10	10	0	10	10	0	24	20	4	10.4	0	0	0	N/A
8	5/4/2015	22	22	0	9	9	0	12	12	0	1	1	0	10.4	0	0	0	N/A
	Total		227			91			102			34						
1	7/15/2016	0	0	0	0	0	0	0	0	0	0	0	0	10.4	2-23	34	68-782	6/12/16 to 7/15/17
2	7/15/2016	3	3	0	0	0	0	3	3	0	0	0	0	10.4	2-23	34	68-782	6/12/16 to 7/15/17
3	7/15/2016	71	69	2	35	35	0	19	19	0	15	15	2	10.4	2-23	34	68-782	6/12/16 to 7/15/17
4	7/15/2016	13	5	8	3	3	0	2	2	0	8	0	8	10.4	2-23	34	68-782	6/12/16 to 7/15/17
6	7/15/2016	57	57	0	41	41	0	13	13	0	3	3	0	10.4	2-23	34	68-782	6/12/16 to 7/15/17
7	7/15/2016	39	39	0	4	4	0	8	8	0	27	27	0	10.4	2-23	34	68-782	6/12/16 to 7/15/17
8	7/15/2016																	
			173			83			45			45						
1	10/26/2016	30	25	5	4	4	0	22	20	2	4	1	3	10.4	2-23	103	206-2,369	7/15/16 to 10/26/16
2														10.4	2-23	103	206-2,369	7/15/16 to 10/26/16
3	10/26/2016	301	282	24	164	164	0	130	117	13	7	1	6	10.4	2-23	103	206-2,369	7/15/16 to 10/26/16
4	10/26/2016	66	55	11	41	41	0	24	14	10	1	0	1	10.4	2-23	103	206-2,369	7/15/16 to 10/26/16
6	10/26/2016	165	155	10	112	112	0	48	43	5	5	0	5	10.4	2-23	103	206-2,369	7/15/16 to 10/26/16
7	10/26/2016	99	92	7	29	29	0	59	53	6	4	3	1	10.4	2-23	103	206-2,369	7/15/16 to 10/26/16
8	10/26/2016	63	58	5	32	32	0	26	22	4	4	3	1	10.4	2-23	103	206-2,369	7/15/16 to 10/26/16
	Total		667			382			269			8						