



Final Project Report

Gamehaven Boy Scout Camp

September 22, 2015

Prepared For Hiawatha Valley Resource Conservation and Development



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WSB Project No. 02791-00

Prescribed Grazing (Goat) Project Gamehaven Site Final Report

For:

Hiawatha Valley Resource Conservation and Development

October 6, 2015

Prepared By:

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Executive Summary

In 2011, McGhie & Betts Inc. was contracted with the Hiawatha Valley Resource Conservation and Development (HVRCD) to monitor a research project aimed to develop invasive species control alternatives using biological control methods as opposed to mechanical or chemical. The biological control method that this project focuses on is prescribed grazing using goats. Six plots were originally chosen for monitoring buckthorn and wild parsnip (**Figure 1**). Following the first year of grazing, the scope of the project was limited to buckthorn monitoring in a single plot. Heavy grazing by 103 mature goats was completed in multiple plots at Gamehaven Boy Scout Camp in Rochester, Minnesota. By 2012, the grazed plots did not show significant decreases in concentration of buckthorn. It was suspected that grazing in the latter end of the growing season did not damage the buckthorn plants to a large degree. Targeted grazing continued through the entire growing seasons of 2012 and 2013, limited to a single plot (Plot 1) with fewer goats (an average of 25 rotating goats from May 11).

Site Description

The Gamehaven Boy Scout Camp 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, 6 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. See **Figure 1** for the original plot and transect locations.

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 (**Figure 2**). Plot 1 consists of a relatively flat area with forested cover and Frankville silt loam soils.

Species of Concern

European buckthorn, *Rhamnus cathartica*, and wild parsnip, *Pastinaca sativa*, were the principle targeted species for grazing at the Gamehaven site.

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 3 to 4 years of age, it begins to produce fruit. Seeds are dispersed through bird droppings and are viable in the soil for an average of 6 years, allowing buckthorn to quickly colonize an area with open canopy and few competitors. When heavily damaged or cut down, buckthorn readily resprouts from the base of the trunk, unless treated with herbicide.

Wild parsnip is a biennial herbaceous plant, producing vegetative growth in the first year, and flowering in the second. It is often found along roadsides, in abandoned fields, on pastures and restored prairies, and disturbed open areas. Bare skin contact with wild parsnip results in blistering, irritation, and discoloration of the skin. When goats were introduced to parsnip plots, they would eat more palatable plants such as raspberries, grape, and honeysuckle before parsnip vegetation. Five goats died during 2011, raising suspicions that wild parsnip was toxic to goats.

However, symptoms of the sick goats matched meningeal worm, a parasite that infects deer and may be spread through deer droppings.

Originally, goats grazed Plots 1 through 6 in August, 2011. After a lack of noteworthy progress, it was determined that grazing should begin early on in the growing season, to remove foliage and increase effectiveness of grazing treatments on buckthorn. Grazing during spring months began in May 2012 and continued for each year of treatment.

Methodology

In 2011, 8 100-foot transects were established in Plots 1 through 5. Three 100-foot transects were established in Plot 1, and 1 100-foot transect was established in each Plot from 2 through 6. Plots 2-5 were monitored for wild parsnip in 2011, while Plot 1 was monitored for buckthorn growth in 2011, 2012, 2014 and 2015. Buckthorn frequency was recorded based on canopy hits per 100 feet of transect and converted to a percentage.

Results

Both buckthorn and wild parsnip data were collected in Plots 1 through 6 in 2011, until the scope of the project was reduced to only buckthorn in Plot 1 in 2012. The first year's results are summarized in **Table 1**.

Plot Number	Buckthorn	Wild Parsnip		
	6-1 - 76%			
1	6-2-32%	Not surveyed		
	6-3 - 32%			
2	Not survoyed	Flower – 5.9%		
	Not surveyed	Rosette – 17.6%		
3	Not surveyed	Flower – 5.4%		
		Rosette – 23.6%		
4	Not survoyed	Flower – 9.7%		
	not surveyed	Rosette – 20.7%		
5	Not surveyed	Flower – 3.9%		
	inot surveyed	Rosette – 9.9%		
6	Not surveyed	Not surveyed		

Table 1: 2011 Grazing Results

During the four years of monitoring, little change was recorded in buckthorn frequency. A summary of the Plot 1 intersections can be found in **Table 2**.

	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

Table 2: Gamehaven Transect Data

Due to buckthorn's prolific seed production, and extended seed dormancy for an average of 6 years, a multi-year plan is necessary to eradicate buckthorn from an area. Since grazing only occurred for 4 years, it is likely that seeds within the forest soil were able to germinate and sprout after older buckthorn plants were grazed and allowed sunlight to reach the forest floor. While goats were able to defoliate mature buckthorn plants, seed consumption and droppings likely exacerbated seedling growth due to an increase of available nutrients. Additionally, goats will need to be fenced in areas to prevent spreading seeds through droppings. Repeated treatments over more years would likely yield more effective buckthorn reduction.

Costs for goat grazing removal totaled approximately \$1,300/acre. Buckthorn removal using chemical and mechanical means total between \$1,000 and \$2,000 based on site location. Given the lack of noticeable reduction of buckthorn and the need for repeated treatments over numerous years, goat grazing may not be the most economically viable option, but a larger dataset would need to be generated to sufficiently determine that. However, combining grazing with chemical or mechanical removal has not been evaluated yet, and the presence of grazing goats at sites has garnered considerable interest from pedestrians and locals, opening the possibility for invasive species education opportunities.

APPENDIX A

Figure 1: Original Grazing Plots Figure 2: Original Transects Figure 3: Plot 1 and Transects



Figure 1: Original Grazing Plots Gamehaven Scout Reservation 5615 Simpson Rd SE Rochester, MN







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Gamehaven Scout Reservation 5615 Simpson Rd SE Rochester, MN



APPENDIX B 2015 Gamehaven Data Sheets

ing Project Field Data	Collection Form		
Data Collector	Data Collector(s): Joey Handtmann		
roject Site Name: Gamehaven		_{#:} 6-1	
t: Total :	# of live stems: 73 T	otal # of dead:	
Class:			
/2-2" 2-4"	>4"		
ing Table			
#/Transect	Species Name	#/Transect	
	ing Project Field Data Data Collector mehaven	ing Project Field Data Collection Form Data Collector(s): Joey Handtma Transect Transect Total # of live stems: 73 Total # of live stems: 74"	

HVRCD Grazing Monitori	ng Project Fie	eld Data Colle	ction Form		
_{Date:} 5/19/15	Data C	Data Collector(s): Joey Handtmann			
Project Site Name: Gar	nehaven)	Trans	sect #: <u>6-</u>	2
Photo #:					
Coordinate Start:					
Coordinate End:					
Buckthorn Data					
Total # of Stems/Transec	t:	Total # of liv	ve stems:	Total #	# of dead:
Total # of Stems by Size C	Class:				
< ½" ½	2-2"	2-4"	>4"		
Additional Species Track	ing Table				
Species Name	#/Transect		Species Name		#/Transect
	1				t

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HVRCD Grazing Monitori	ng Project Field Data Co	ollection Form		
_{Date:} 5/19/15	Data Collector(s): Joey Handtmann			
Project Site Name: Gamehaven		Transe	Transect #:	
Photo #:			_	
Coordinate Start:				
Coordinate End:				
Buckthorn Data				
Total # of Stems/Transect	: <u>86</u> Total # o	f live stems:	Total # of dead:	
Total # of Stems by Size C	lass:			
< ½" ½	-2" 2-4"	>4"		
Additional Species Tracki	ng Table			
Species Name	#/Transect	Species Name	#/Transect	

APPENDIX C Photos **Transect 6-3 (May 2015)**



Transect 6-2 (May 2015)



Transect 6-1 (May 2015)



Plot 1, Pre-Grazing (August 2011)





Plot 1, Post Grazing (September 2011)



Typical Goat Enclosure (September 2011)