

THE APPLICATION OF SUCCESSIONAL THEORY-BASED  
MANAGEMENT TO MINNESOTA PRAIRIE SITES  
DEGRADED BY INVASIVE PLANT SPECIES

by

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This thesis submitted by Jamie R. Hanson in partial fulfillment of the requirements for the Degree of Master of Science at St. Cloud State University is hereby approved by the final evaluation committee.

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THE APPLICATION OF SUCCESSIONAL THEORY-BASED  
MANAGEMENT TO MINNESOTA PRAIRIE SITES  
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Jamie R. Hanson

A thesis project at Camp Ripley Army National Guard Training Site will address the effectiveness of directing succession as a means of restoring areas dominated by perennial terrestrial invasive species: Common Tansy (*Tanacetum vulgare*) and Spotted Knapweed, (*Centaurea stoebe ssp. micranthos*). The purpose of this project is to design and implement an experiment that will test different combinations of treatments that alter the three factors of site availability, species availability, and species performance, as defined by Pickett et al. (1987) and Sheley et al. (2003). Altering these three factors is done with the goal of restoring perennial invasive-species-dominated areas into a native plant community. My experimental objective is to determine if succession-based management strategies are an appropriate methodology for the restoration of Minnesota prairie ecosystems that are impacted by invasive species, as it has been shown that invasive species can severely degrade ecosystems. The research question further involves determining which practices within this framework of succession are most effective in restoring Minnesota prairie ecosystems that are degraded by the presence of these invasive plant species. This experiment took place in spring 2010 through fall 2011 and incorporated site manipulation of four seedbed preparations, two cover crop types, and two seed dispersal methods. The addition of a fourth factor involved the application of a selective herbicide, Milestone, to half of each plot. Statistical analysis determined that by the end of data collection in August 2011, all levels from the first three factors in the experimental design did not significantly reduce either invasive species. The application of the fourth factor did significantly reduce both invasive species' mean percent cover. However, a negative consequence of this selective herbicide is reduction in species richness in plots and increase in non-native grass cover. It is

recommended, due to the nature of succession, continued monitoring, data collection, and analysis occur on experimental sites.

\_\_\_\_\_  
Month            Year

Approved by Research Committee:

\_\_\_\_\_  
Jorge Arriagada                      Chairperson

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## TABLE OF CONTENTS

	Page
LIST OF TABLES .....	viii
LIST OF FIGURES .....	xi
Chapter	
1. INTRODUCTION .....	1
Invasive Species .....	1
Common Tansy and Spotted Knapweed .....	6
Ecological Succession .....	13
Objectives .....	19
2. METHODS .....	22
Study Site .....	22
Experimentation Design .....	26
Procedures .....	28
3. RESULTS .....	36
Initial Data Collection—2010 .....	36
Senescent Stand Data Collection—2011 .....	37
Emergent Stand Data Collection—2011 .....	40
Post-Milestone Application Data Collection—2011 .....	42

Chapter	Page
2011 Vegetation Surveys .....	45
Statistical Analyses .....	56
Boxplot Figures .....	66
4. DISCUSSION .....	73
REFERENCES .....	77
APPENDIX .....	89

## LIST OF TABLES

Table	Page
1. Ups13 Southern Dry Prairie native plant community as defined by the DNR Ecological Classification System 2005 .....	24
2. UTM GPS Point Location of Blocks at Camp Ripley, MN .....	28
3. Timeline of events in 2010 .....	34
4. Timeline of events in 2011 .....	35
5. A random number generator was used to determine the number of steps walked within the block to visually estimate senescent stand invasive species percent cover in April 2010 of a meter sized area at that point with a total of 16 points per block .....	37
6. April 2011 senescent stand mean percent cover of spotted knapweed .....	39
7. April 2011 senescent stand mean percent cover of common tansy .....	39
8. A block mean of visual estimates of senescent stand invasion species percent cover in April 2011 of each 10 by 20 meter plot .....	40
9. May 2011 emergent stand mean percent cover of spotted knapweed .....	41
10. May 2011 emergent stand mean percent cover of common tansy .....	41
11. A block mean of visual estimates of emergent stand invasive species percent cover in May 2011 of each 10 by 20 meter plot .....	42
12. July 2011 Post-selective-herbicide treatment mean percent cover of spotted knapweed .....	44
13. July 2011 Post-selective-herbicide treatment mean percent cover of common tansy .....	44



Table	Page
14. A block mean of visual estimates of post-selective-herbicide treatment invasive species percent cover in July 2011 of each 10 by 20 meter plot .....	45
15. 2011 Species Richness per half-plot (# spp.) with 1m squared quadrat sampling frame randomly placed at least one meter from buffer zone .....	47
16. Species richness per half-plot (# spp.) with 1m squared quadrat sampling frame randomly placed at least one meter from buffer zone	48
17. Forb and tree surveys in June and August 2010 .....	49
18. Forb and tree surveys in August 2011 .....	51
19. Grass surveys in August 2010 .....	52
20. Grass surveys in August 2011 .....	53
21. Cover class mean values for every treatment of the four blocks in spotted knapweed areas was determined by randomly placing a 0.2 by 0.5 m Daubenmire frames in each half-plot .....	54
22. Cover class mean values for every treatment of the four block in common tansy areas was determined by randomly placing a 0.2 by 0.5 m Daubenmire frames in each half-plot .....	55
23. Common tansy independent samples t-test for species richness in plot halves with and without a selective herbicide application .....	58
24. Spotted knapweed independent samples t-test for species richness in half-plots with and without a selective herbicide application .....	59
25. Univariate ANOVA for spotted knapweed areas with the Between- Subjects factors of seedbed preparation (SP), cover crop (CC), seeding method (SM), selective herbicide application (MS), and block .....	59
26. Univariate ANOVA for spotted knapweed .....	61
27. Repeated Measures ANOVA for spotted knapweed areas with the Within-Subjects Effects of time on mean percent cover .....	62

Table	Page
28. Repeated Measures ANOVA for spotted knapweed .....	62
29. Univariate ANOVA for common tansy area with the Between-Subjects factors of seedbed preparation (SP), cover crop (CC), seeding method (MS), selective herbicide application (MS), and block .....	63
30. Univariate ANOVA for common tansy .....	65
31. Repeated Measures ANOVA for common tansy areas with the Within-Subjects Effects of time on mean percent cover .....	65
32. Repeated Measures ANOVA for common tansy .....	66

## LIST OF FIGURES

Figure	Page
1. Common tansy ( <i>Tanacetum vulgare</i> ) and spotted knapweed ( <i>Centaureastoebe ssp. Micranthos</i> ) distribution as of 2010 at Camp Ripley .....	9
2. The Pine Moraines and Outwash Plains, Hardwood Hills, and Anoka Sand Plain subsections converge at Camp Ripley .....	23
3. A randomized complete block design (2x2x4) .....	26
4. Treatment assignments were determined by plots receiving a random number between 1-16 .....	27
5. Spotted knapweed blocks' mean percent cover measures for all data sets .....	67
6. Spotted knapweed mean percent cover measures per data set .....	68
7. Spotted knapweed mean percent cover measures for plot halves within blocks that received no selective herbicide versus those half-plots that received a selective herbicide application .....	69
8. Common tansy mean percent cover measures per block .....	70
9. Common tansy mean percent cover measures per data set .....	71
10. Common tansy mean percent cover measures for plot halves within blocks that received no selective herbicide versus those half-plots that received a selective herbicide application .....	72