

WHERE DID THE TREES GO? AN EXPLORATION OF PEOPLE'S AFFECTIVE
RESPONSE, ATTACHMENT, AND INTENTION TO PERFORM PLACE-
PROTECTIVE BEHAVIORS FOR AN ACTIVELY MANAGED URBAN NATURE
PRESERVE

A Thesis

Presented to the Faculty of the Graduate School
of Cornell University

In Partial Fulfillment of the Requirements for the Degree of
Master of Science

by

Sarah Marie Naiman

December 2017

© 2017 Sarah Marie Naiman

ABSTRACT

Many nature preserves and natural areas require the use of active management practices to remove invasive species and promote the overall health of the preserve. While some research has investigated the public's reaction to various management practices, few have focused on intensive habitat management contexts. Individuals' reactions to the use of active management practices have serious implications for nature preserves as the public's discontent with active management has previously delayed or impeded restoration work that led to a decline in ecosystem health. This thesis aims to explore how the use of active management practices influences individuals' affective response to the managed landscape, level of attachment to the preserve, and intention to perform place-protective behaviors. Additionally, we quantitatively examine the influence of other factors (i.e. knowledge, attitudes, perceived risk, responsibility, and identity) on individuals' intention to perform place-protective behaviors.

BIOGRAPHICAL SKETCH

Sarah Naiman was born and raised in Chicago, IL. Growing up in a highly urbanized environment, she remembers loving the outdoors and exploring local forest preserves with family and friends. She attended Loyola University Chicago in Chicago, IL where she majored in environmental science. Due to Loyola's focus on sustainability and community engagement, Sarah participated in several hands-on projects that dealt with the human dimensions of environmental issues. This included projects that promoted sustainability on campus such as a campaign to incorporate more sustainable food into Loyola's food system and an evaluation of students' knowledge and involvement in composting on campus. Other projects focused on applying environmental principles to community problems. These included an assessment of the effectiveness of a local environmental justice campaign and identification of barriers and motivations to the adoption of green practices at local restaurants. However, the most impactful experience was in her senior year. Under the guidance of her advisor, Sarah was awarded an undergraduate research fellowship where she qualitatively explored the barriers and motivations to Latino environmental engagement. She graduated *sum cum laude* in August of 2014.

After graduating from college, Sarah took a year off exploring her interest in minority environmental engagement. She participated in Cornell University's EE Capacity Peer Learning Community around the environmental education of Latinos and joined Environmentalists of Color, a Chicago-based group aimed towards providing networking opportunities and mentorship to people of color in the environmental field. Sarah entered the Department of Natural Resources at Cornell University in the Fall of 2015 and completed her Master's Degree in 2017. She will continue in the Ph.D. program in the Department of Natural Resources at Cornell University.

ACKNOWLEDGMENTS

I would like to thank my advisor, Dr. Shorna Allred for her continued support and guidance throughout the process of completing this thesis. Thank you for believing in my ability to successfully navigate graduate school and making me feel welcome at Cornell. I'd also like to thank my committee members, Dr. Jonathon Schuldt and Dr. Richard Stedman, for the insight and advice they provided me throughout this process. I am very fortunate they served on my committee. I also would like to acknowledge the Albany Pine Bush Preserve and Cornell University for providing financial support for my research. A special thanks to Neil Gifford and Erin Kinal for their time and continuous feedback on the project and my thesis.

I am appreciative of the faculty, staff, and students in the Human Dimensions Research Unit for their willingness to talk through my research ideas and their reviews and suggestions on earlier drafts of my thesis. I am also grateful for my undergraduate advisor, Tania Schusler, who piqued my interest in the human dimensions of environmental work and without whom I would not have pursued a graduate education at Cornell University.

Finally, I would like to thank all of my friends and family in Ithaca and back home in Chicago for their support. I am extremely appreciative of Jacob, who was willing to drive countless hours to help me deliver surveys in Albany, supported me when I was feeling frustrated, and helped keep my life balanced between work and school. Thanks to my roommates for helping me get accustomed to Ithaca and destress when I needed it. Last, but not least, I want to thank my dad for supporting my desire to continue my education, his constant encouragement, and weekly check-ins.

TABLE OF CONTENTS

ABSTRACT	i
BIOGRAPHICAL SKETCH	ii
ACKNOWLEDGEMENTS	iii
CHAPTER 1: INTRODUCTION	1
Predicting Behavioral Intention.....	2
Thesis Objectives	5
References	7
CHAPTER 2: WHERE DID THE TREES GO? PUBLIC’S PERCEPTIONS AND POLITICAL SUPPORT FOR ACTIVELY MANAGED URBAN NAUTRE PRESERVES	12
Abstract	12
Introduction	13
Literature Review	15
Rationale.....	24
Methods	25
Study Site: The Albany Pine Bush Preserve.....	25
Procedure	27
Measures	29
Data Analysis	34
Results	35
Data Transformations.....	36
Respondent Characteristics	36
Public Attitudes and Awareness of Management	38
Place-Protective Behavioral Intention to Support the Albany Pine Bush Preserve.....	39
Personal Responsibility to Support the Albany Pine Bush Preserve	41
Discussion	43
Active Management on Place-protective Behaviors and Responsibility	43
Predicting Place-protective Behavioral Intention for Actively Managed Nature Preserves	44
Responsibility for Actively Managed Nature Preserves	46
Limitations and Future Research	46
Conclusion.....	47
References	48

CHAPTER 3: TOPOPHILIA VS. BIOPHILIA: AN INVESTIGATION OF THE ROLE OF PLACE PREFERENCE AND VISITOR TYPOLOGIES ON PLACE ATTACHMENT AND PLACE-PROTECTIVE BEHAVIORS	57
Abstract	57
Introduction	58
Literature Review	60
Rationale.....	70
Methods	71
Study Site: The Albany Pine Bush Preserve.....	71
Procedure	73
Measures	75
Data Analysis	80
Results	82
Data Transformations.....	82
Respondent Characteristics.....	83
Preference for Early Successional or Late-Successional Landscapes	86
Visitor Typologies and Place	90
Predictors of Intention to Perform Place-protective Behaviors	92
Discussion	93
Preference for Early Successional or Late-Successional Landscapes	93
Visitor Typologies: How Individuals Use and Relate to Early Successional Habitats.....	94
Predicting Place-protective Behaviors for Early Successional Habitats.....	95
Limitations and Future Research	96
Conclusion.....	96
References	98
CHAPTER 4: CONCLUSION	106
Summary of Key Findings	106
Discussion of Key Findings	107
Limitations and Future Research.....	110
Conclusion: Practical Applications	111
References	113
APPENDICES	115
Appendix A: Survey Cover Letters for Mail, Web, and Drop-Off Surveys	115
Appendix B: Chapter 2 Non-Response Bias Analysis and Comparisons to Census Data	125
Appendix C: Chapter 2 Factor Analysis and Scale Reliability	129
Appendix D: Chapter 2 Independent Variable Correlation Table	134
Appendix E: Survey with Descriptive Results for Individuals Living within 10 miles.....	135
Appendix F: Chapter 3 Non-Response Survey and Bias Analyses.....	152
Appendix G: Chapter 3 Factor Analysis and Scale Reliability	154
Appendix H: Chapter 3 Independent Variable Correlation Table.....	158

Appendix I: Survey with Descriptive Results for Visitors of the Albany Pine Bush
Preserve.....159

LIST OF FIGURES

Figure 1.1: Predicting Behavioral Intention Conceptual Framework

Figure 2.1: Model of Place-Protective Behavioral Intention

Figure 2.2: Map of the Albany Pine Bush Preserve

LIST OF TABLES

Table 2.1: Means and percentages for dependent and independent variables and demographics (Bolded items are reference categories)

Table 2.2: Simple model of awareness and attitudes towards management practices with an interaction on intention to perform place-protective behaviors

Table 2.3: Full multiple linear regression model for place-protective behavioral intention

Table 2.4: Parameter estimates, standard errors, and odds ratios from binary logistic regression model of personal responsibility

Table 3.1: Means and percentages for variables and demographics

Table 3.2a: Means and standard deviations for how appealing individuals in each preference group found the early successional and late-successional landscape images

Table 3.2b: Mean and standard deviations for how likely individuals in each preference group were to recreate in the early successional landscape and late-successional landscapes

Table 3.3: Means and t-test results for affective responses to the Albany Pine Bush Preserve by visitors' aesthetic or recreational preferences for early successional or late-successional landscapes

Table 3.4: Means and t-test results for overall affective response to the Albany Pine Bush Preserve, place attachment, and intention to perform place-protective behaviors by visitors' aesthetic or recreational preferences for early successional or late-successional landscapes

Table 3.5: Means and t-test results for level of place attachment and intention to perform place-protective behaviors by visitor type

Table 3.6: Multiple linear regression model for place-protective behavioral intention

CHAPTER 1: INTRODUCTION

Active management practices are techniques that are used to improve the health of an ecosystem. The techniques themselves include the use of prescribed burns which are controlled fires that promote soil fertility, allow seed dispersal, and mitigate competition (Askins, 2001) or mechanical treatments such as cutting, mowing, and herbicide use to remove invasive species and create openings in forests or other habitats (Lorimer, 2001). Outside of habitat management, active management practices have also been used to reduce the risk of severe wildfires in the Western United States (Cortner, et al., 1984; Czaja, et al., 2016; Taylor & Daniel, 1984) and provide economic benefits to communities who utilize sustainable harvesting in forests in the United States (Rogers, Hoover, & Allred, 2013; Schaaf, Ross-Davis & Broussard, 2006).

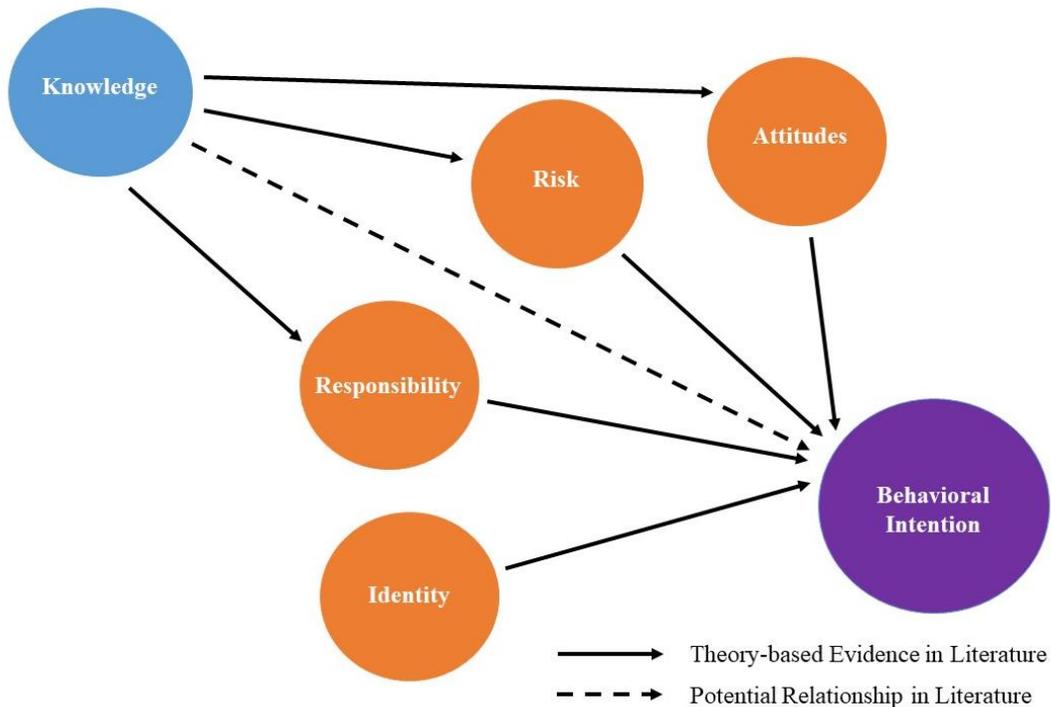
Public acceptance of a management practice depends on their attitudes towards the management practice itself as well as the context in which the practice is used. Different management practices have different levels of acceptance. For example, the use of prescribed burns in the Western United States are widely accepted by the public as a result of awareness campaigns around their effectiveness in reducing the frequency of severe wildfires (Cortner, et al., 1984; Loomis, et al., 2001; Taylor & Daniel, 1984). In contrast, the removal of trees and use of mechanical treatments has mostly been deemed as a negative practice even if the action is done to improve the health of the ecosystem (Gobster, 1997; Gobster, 2000; Temple, 1990). In urban contexts, people hold especially strong attachments to trees because of their functional, economic, aesthetic, and symbolic values in urban environments (Dickie, et al., 2014; Gobster, 1997). However, a recent national study found that individuals would be accepting of the use of tree removal for economic and habitat management reasons (Schaaf, Ross-Davis & Broussard, 2006).

Studies have found that discontent with the use of active management practices has led to public opposition that has delayed and impeded restoration work in nature preserves and natural areas across the country (Shore, 1997). However, it is unclear how the use of active management practices at a nature preserve influences individuals' intention to perform pro-environmental behaviors (i.e. activities aimed to yield positive environmental impacts) for an actively managed nature preserve (Cooper, Larson, Dayer, Stedman, & Decker, 2015).

Predicting Behavioral Intention

For this thesis, I explore the relationship between knowledge attitudes, risk, responsibility, and identity on an individual's intention or plan to perform pro-environmental behaviors (*Figure 1.1*). Below I discuss in detail the meaning of each factor and its relationship to behavioral intention.

Figure 1.1: Predicting Behavioral Intention Conceptual Framework



Knowledge

Within the Reasoned Action Approach (RAA), knowledge has been referred to as individuals' knowledge about the behavior of interest (Fishbein & Ajzen, 2010). While knowledge does not directly predict behavioral intention (Bright, Barro, & Burtz, 2002; Hungerford & Volk, 1990), it influences other factors that directly predict behavioral intention (i.e. attitudes, perceptions of risk, and responsibility) (Fishbein & Ajzen, 2010; Forsyth, et al., 2004). With respect to attitudes, individuals may rely on knowledge or facts in the development of their attitudes (Aronson, Wilson, & Akert, 2012). In addition, knowledge has been operationalized as awareness. According to the protection motivation theory, individuals must be aware of threats to assess the severity of the threat risk which can lead to the performance of behaviors (Rogers, 1975). Along a similar vein, for a person to have a sense of responsibility for an object they must be aware of the object (Story & Forsyth, 2008). However, research into the performance of pro-environmental behaviors (as discussed in Chapter 2) has found that some types of environmental knowledge have a direct relationship on behavioral intention (Frick, Kaiser, & Wilson, 2004).

Attitudes

An attitude is an internal response to an object, idea or person (Ajzen and Fishbein, 2005; Banaji and Heiphetz, 2010; Bohner & Dickel, 2011; Eagly and Chaiken, 2007; Petty, Haugtvedt, & Smith, 1995). Attitudes that are developed cognitively are likely to be maintained over time, be consistent with behavior, and resistant to persuasion (Aronson, Wilson, Akert, 2012). Attitudes that are tied to identity and have a strong affective component (i.e. emotions) are also rather stable and more difficult to change (Heberlein,

2012). According to Fishbein & Ajzen's (1977; 2010) behavioral intention framework, attitudes directly predict behavioral intention.

Identity

Identity reflects the amalgamation of many different personal qualities into how an individual perceives themselves (Sparks & Guthrie, 1998; Stryker, 1980). According to Stryker (1980), identities are organized hierarchically based upon their salience. Therefore, individuals will perform behaviors that align with their most salient identity. Individuals hold role-identities that reflect their actions within a social structure, and social identities that are attributed to group relations. The development and salience of these identities can be influenced by an individual's physical and social setting (Callero, 1985; Stedman, 2002; Stryker, 1980; Terry, et al., 1999). Thus, an individual's actions rely on the context in which the individual is expected to perform a behavior.

Perceived Risk

In addition to attitudes and identity, an individual's perceptions of risk and is also important in their intention to perform behaviors. According to the protection motivation theory, individuals' perceptions of risk can change their behavior. Individuals who perceive objects to be at risk, are more likely to perform behaviors that will protect those objects (Brewer, Weingstein, Cuite, & Herrington, 2004; Milne, Sheerna, & Orbell, 2000; Rogers, 1975). In addition to a perception of a risk, studies have found that individuals must believe that the risk or threat is serious enough to warrant action (Van Vugt & Samuelson, 1999).

Responsibility

In social contexts, responsibility becomes an important influence on behavior due to the potential for a diffusion of social responsibility. Diffusion of responsibility is when individuals do not feel obligated to act under the assumption that someone else will (Latané & Darley, 1970). The more individuals that are available to take an action, the less likely any single individual will (Latané & Darley, 1970). However, if individuals believe that others will not or are unable to intervene, they feel a stronger personal responsibility to act (Leary & Forsyth, 1987). This feeling of personal responsibility has been found to directly influence behavioral intention (Bamberg & Möser, 2007; Story & Forsyth, 2008).

Thesis Objectives

While the relationship between knowledge, attitudes, identity, risk, and responsibility has been explored in a wide variety of contexts, I seek to explore the predictive power of these factors on place-protective behavioral intention in support of an actively managed urban nature preserve. In Chapter 2, I explore how the use of active management practices at an urban nature preserve influence local residents' intention to perform place-protective behaviors. In addition, I examine the influence of knowledge, attitudes, perceived risk, and identity on individuals' sense of personal responsibility and behavioral intention.

In Chapter 3, I specifically focus my analysis on visitors of the Albany Pine Bush Preserve, an urban early successional habitat that requires the use of active management practices. Within the analysis, I examine the role of individuals' preferences for early successional habitats, visitor typologies, and place attachment in predicting their intention to perform place-protective behaviors.

Finally, Chapter 4, draws from the findings of both Chapter 2 and 3 to discuss factors that influence individuals' intention to perform place-protective behaviors for actively managed landscapes, provide theoretical and practical implications of my thesis and suggestions for future research.

REFERENCES

- Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In D. Albarracín, B.T. Johnson, & M.P. Zanna (Eds.), *The handbook of attitudes*, (pp. 173-221). New York, NY: Psychology Press.
- Aronson, E., Wilson, T. D., & Akert, R. M. (2012). *Social psychology* 8th Ed. Upper Saddle River, New Jersey: Pearson.
- Askins, R. A. 2001. Sustaining biological diversity in early successional communities: the challenge of managing unpopular habitats. *Wildlife Society Bulletin* 20: 407-412.
- Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, 27(1), 14-25.
- Banaji, M. R., & Heiphetz, L. (2010). Attitudes In S.T. Fiske, D.T. Gilbert, & G. Lindzey (Eds.), *Handbook of Social Psychology Volume One* (pp. 353-393). Hoboken, NJ: John Wiley & Sons, Inc.
- Bohner, G., & Dickel, N. (2011). Attitudes and attitude change. *Annual Review of Psychology*, 62, 391-417.
- Brewer, N. T., Weinstein, N. D., Cuite, C. L., & Herrington, J. E. (2004). Risk perceptions and their relation to risk behavior. *Annals of Behavioral Medicine*, 27(2), 125-130.
- Bright, A. D., Barro, S. C., & Burtz, R. T. (2002). Public attitudes toward ecological restoration in the Chicago metropolitan region. *Society & Natural Resources*, 15(9), 763-785.
- Callero, P. L. (1985). Role-identity salience. *Social Psychology Quarterly*, 48(3), 203-215.
- Cortner, H. J., Zwolinski, M. J., Carpenter, E. H., & Taylor, J. G. (1984). Public support for fire-management policies. *Journal of Forestry*, 82(6), 359-361.

- Cooper, C., Larson, L., Dayer, A., Stedman, R., & Decker, D. (2015). Are wildlife recreationists conservationists? Linking hunting, birdwatching, and pro-environmental behavior. *The Journal of Wildlife Management*, 79(3), 446-457.
- Czaja, M. R., Bright, A. D., & Cottrell, S. P. (2016). Integrative complexity, beliefs, and attitudes: Application to prescribed fire. *Forest Policy and Economics*, 62, 54-61.
- Dickie, I. A., Bennett, B. M., Burrows, L. E., Nuñez, M. A., Peltzer, D. A., Porté, A., Richardson, D., Rejmanek, M., Rundel, P., & van Wilgen, B. W. (2014). Conflicting values: ecosystem services and invasive tree management. *Biological Invasions*, 16(3), 705-719.
- Eagly, A. H., & Chaiken, S. (2007). The advantages of an inclusive definition of attitude. *Social Cognition*, 25(5), 582-602.
- Fishbein, M., & Ajzen, I. (1977). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York, NY: Taylor & Francis Group.
- Forsyth, D. R., Garcia, M., Zyzniewski, L. E., Story, P. A., & Kerr, N. A. (2004). Watershed pollution and preservation: The awareness–appraisal model of environmentally positive intentions and behaviors. *Analyses of Social Issues and Public Policy*, 4(1), 115-128.
- Frick, J., Kaiser, F. G., & Wilson, M. (2004). Environmental knowledge and conservation behavior: Exploring prevalence and structure in a representative sample. *Personality and Individual Differences*, 3 (8), 1597-1613.
- Gobster, P. H. (1997). The Chicago wilderness and its critics: the other side: a survey of arguments. *Restoration and Management Notes*, 15(1), 33-38.

- Gobster, P. H. (2000). Restoring nature: Human actions, interactions, and reactions. In P. H. Gobster & R. B. Hull (Eds.), *Restoring nature: Perspectives from the social sciences* (pp.1-19). Washington, DC: Island Press.
- Heberlein, T. A. (2012). *Navigating environmental attitudes*. New York, NY: Oxford University Press.
- Hungerford, H. R., & Volk, T. L. (1990). Changing learner behavior through environmental education. *The Journal of Environmental Education*, 21(3), 8-21.
- Latané, B., & Darley, J. M. (1970). *The unresponsive bystander: Why doesn't he help?*. New York, NY: Appleton-Century-Crofts.
- Leary, M. R., & Forsyth, D. R. (1987). Attributions of responsibility for collective endeavors. *Review of Personality and Social Psychology*, 8, 167–188.
- Loomis, J. B., Bair, L. S., & González-Cabán, A. (2001). Prescribed fire and public support: Knowledge gained, attitudes changed in Florida. *Journal of Forestry*, 99(11), 18-22.
- Lorimer, C. G. (2001). Historical and ecological roles of disturbance in eastern North American forests: 9,000 years of change. *Wildlife Society Bulletin*, 29(2), 425-439.
- Milne, S., Sheeran, P., & Orbell, S. (2000). Prediction and intervention in health-related behavior: A meta-analytic review of protection motivation theory. *Journal of Applied Social Psychology*, 30(1), 106-143.
- Petty, R. E., Haugtvedt, C. P., & Smith, S. M. (1995). Elaboration as a determinant of attitude strength: Creating attitudes that are persistent, resistant, and predictive of behavior In R.E. Petty & J.A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 93-130). New York, NY: Psychology Press

- Rogers, C. R. (1975). Empathic: An unappreciated way of being. *The Counseling Psychologist*, 5(2), 2-10.
- Rogers, S. C., Hoover, W. L., & Allred, S. B. (2013). Public acceptability of forest management practices at Morgan-Monroe State Forest. In R.K. Swithart, M.R. Saunders, R.A. Kalb, G.S. Haulton, & C.H. Michler (Eds.), *The Hardwood Ecosystem Experiment: a framework for studying responses to forest management*. Gen. Tech. Rep. NRS-P-108. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station: 254-286.
- Schaaf, K. A., Ross-Davis, A. L., & Broussard, S. R. (2006). Exploring the dimensionality and social bases of the public's timber harvesting attitudes. *Landscape and Urban Planning*, 78(1), 135-146.
- Shore, D. (1997). The Chicago Wilderness and its Critics: Controversy Erupts Over Restoration in Chicago Area. *Restoration & Management Notes*, 15(1), 25-31.
- Sparks, P., & Guthrie, C. A. (1998). Self-Identity and the Theory of Planned Behavior: A Useful Addition or an Unhelpful Artifice?. *Journal of Applied Social Psychology*, 28(15), 1393-1410.
- Stedman, R. C. (2002). Toward a social psychology of place predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behavior*, 34(5), 561-581.
- Story, P. A., & Forsyth, D. R. (2008). Watershed conservation and preservation: Environmental engagement as helping behavior. *Journal of Environmental Psychology*, 28(4), 305-317.
- Stryker, S. (1980). *Symbolic interactionism: A social structural version*. San Francisco, CA: Benjamin-Cummings Publishing Company.

- Taylor, J. G., & Daniel, T. C. (1984). Prescribed fire: Public education and perception. *Journal of Forestry*, 82(6), 361-365.
- Temple, S. A. (1990). The nasty necessity: eradicating exotics. *Conservation Biology*, 4(2), 113-115.
- Terry, D. J., Hogg, M. A., & White, K. M. (1999). The theory of planned behaviour: self-identity, social identity and group norms. *British Journal of Social Psychology*, 38(3), 225-244.
- Van Vugt, M., & Samuelson, C. D. (1999). The impact of personal metering in the management of a natural resource crisis: A social dilemma analysis. *Personality and Social Psychology Bulletin*, 25(6), 735-750.

CHAPTER 2: WHERE DID THE TREES GO? PUBLIC'S PERCEPTIONS AND POLITICAL SUPPORT FOR AN ACTIVELY MANAGED URBAN NATURE PRESERVE

ABSTRACT

With the increased concentration of humans in urban centers, natural areas have become threatened by expanding commercial and residential development. Therefore, there is a need for public support to protect and maintain these areas. Land managers often utilize active management practices such as prescribed burns and tree removal techniques to maintain the health of the ecosystem. However, studies suggest that public support for actively managed areas may be difficult due to the public's lack of approval of the use of active management practices and preference for unmanaged landscapes. This study aims to understand how the public's attitudes towards management practices, environmental identity, personal responsibility, perceived risk, and knowledge predict their intention to perform place-protective behaviors in support of the Albany Pine Bush Preserve, an actively managed urban nature preserve in Albany, NY. I found that individuals' attitudes towards management practices are only predictive of place-protective behavioral intentions if people are also aware of the preserve's use of management practices. However, the significance of the attitudes and awareness interaction dissipated upon the introduction of personal responsibility, perceived risk, and environmental identity factors into the model. Further, I found that a high sense of responsibility, environmental identity, and effectiveness knowledge were significant predictors of place-protective behavioral intention. My findings suggest that bolstering individuals' personal responsibility for the preserve through appeals to their environmental identity may aid in promoting the public's performance of place-protective behaviors for actively managed urban nature preserves.

INTRODUCTION

According to the 2010 U.S. Census, 81% of the population live in urban areas (U.S. Census, 2012). The population estimates of major U.S. cities continue to rise as they surpass previous estimates (U.S. Census, 2012). As urban areas expand, natural areas and green spaces become threatened by increased commercial and residential development (Brandon, Redford, & Sanderson, 1998; Seto, Fragkias, Güneralp, & Reilly, 2011; Seto, Güneralp, & Hutyrá, 2012). Individuals' access to green spaces is important because it positively impacts humans' mental and physical health (Beatley, 2009; 2011; Pretty, 2004; United States Congress, 2008). These mental and physical benefits were recognized by the United States government and influenced programs that encouraged youth interaction with natural spaces through the adoption of legislation like the "No Child Left Inside Act of 2008" (United States Congress, 2008). In addition to encouraging human interaction with natural areas, government and environmental organizations have worked towards protecting habitat since the early 1960's through the establishment and maintenance of nature preserves and habitat restoration. However, the sustainability of these programs requires the support of the public to secure funds for staff, management, equipment, and programs.

Studies have found that urban residents across the U.S. engage in activities that improve the natural environment within their communities, particularly when the natural environment had been damaged or threatened (Tidball & Krasny, 2007; Krasny & Tidball, 2012). In addition to perceptions of risk (Forsyth, et al, 2004; Stedman, 2002), individuals' level of environmental knowledge (Frick, et al, 2004), attitudes (Bamberg & Möser, 2007; Steg & Vlek, 2009), environmental identity (Clayton, 2003), and personal responsibility (Story & Forsyth, 2008) have also positively influenced people's intention to perform pro-environmental behaviors (i.e. actions that have positive environmental impacts).

People's reaction to the use of active management at a nature preserve is also important in understanding their support for actively managed areas. Due to the introduction of non-native species and other influences, nature preserve maintenance requires the use of active management practices (i.e. prescribed fire, tree removal, and invasive species removal) to maintain the health of the preserve (Grumbine, 1994). Studies have investigated the public's acceptance of the use of active management practices in a variety of settings including reducing the risk of wildfires in the Western United States (Cortner, Zwolinski, Carpenter, & Taylor, 1984; Czaja, Bright, & Cottrell, 2016; Kaval, Loomis, & Seidl, 2007; Taylor & Daniel, 1984) and harvesting timber in forested areas across the United States (Bliss, 2000; Bliss, et al., 1997; Bourke & Luloff, 1994; Rogers, Hoover, & Allred, 2013). However, few studies have examined the acceptance of active management practices at urban nature preserves. Additionally, there is conflicting research about whether the public accepts or expresses discontent with the use of active management practices (Bright, Barro, & Burtz, 2002; Gobster, 1997; Gobster, 2001; Rogers, Hoover, & Allred, 2013).

Public acceptance of active management is imperative to the protection of actively managed nature preserves because public discontent with active management practices has previously delayed and impeded restoration work in nature preserves and natural areas across the country (Shore, 1997). In 1996, the public was so disgruntled with the use of management practices at the Cook County Forest Preserves in Chicago, Illinois that they influenced the local government to place a moratorium on restoration activities (Shore, 1997). According to Becker (2001), the moratorium had negative consequences for the native ecosystems across the city. Though the moratorium was partially lifted in 2001, the Chicago case highlights a need to understand how the public's attitudes towards management practices can influence their intention to support an actively managed urban nature preserve. Especially since other municipal forest management

ordinances across the country have similarly delayed or prohibited the use of active management practices (Forman-Cook, Malmsheimer & Germain, 2015; Mortimer, et al., 2006; Shore, 1997).

While previous studies have investigated the attitudes and behavior of urban residents towards green spaces, few studies have explored the influence of active management on the attitudes and behaviors of urban residents. This study seeks to understand the elements that influence an individual's intention to support an urban nature preserve that uses controversial management practices. I will explore how residents' knowledge, attitudes, environmental identity, and perceived risk influence their sense of responsibility to support an urban nature preserve and their intention to perform a variety of place-protective behaviors in support of an actively managed urban nature preserve.

LITERATURE REVIEW

Pro-environmental behavioral intention

Pro-environmental behaviors are activities that generate or intend to yield positive environmental impacts and promote environmental quality (Cooper, Larson, Dayer, Stedman, & Decker, 2015). Pro-environmental behaviors can encompass a wide array of activities including: environmental activism (e.g. politically campaigning), political behaviors (e.g. signing petitions or donating money), consumer behaviors (e.g. buying green products), and stewardship behaviors (e.g. planting trees) (Monroe, 2003; Stern, 2000). Research regarding acceptance of active management practices and nature preserves has predominantly explored political behaviors, but other civic behaviors such as visiting the preserve, volunteering, and avoiding sensitive areas are also important for ensuring the existence of a healthy nature preserve (Halpenny, 2010; Kaval, Loomis, & Siedl, 2006; Stedman, 2002). Pro-environmental behaviors that are tied to a place, can

be categorized as place-protective behaviors. These are behaviors “that maintain or enhance valued attributes of the setting” (Stedman, 2002, p. 561). Place-protective behaviors are performed to protect a place from elements that threaten the meaning or existence of the place and may include protesting development (Devine-Wright & Howes, 2010), donating money to protect the land and its management (Story & Forsyth, 2008), or volunteering time to perform stewardship activities, etc. (Larson, Stedman, Cooper, & Decker, 2015).

Environmental Identity

When trying to understand pro-environmental behaviors of any type, how people relate to the natural world is very important to understanding how they think and feel about different natural spaces. An environmental identity is similar to a social or group identity in which the adoption of the identity and its meaning can vary from person to person within a group (Clayton, 2003). While environmental identity is formed through an individual’s interactions with nature, it is not tied to a specific place or geographic region. Thus, the values and beliefs associated with environmental identity may be transferable to various contexts when activated or salient (Stryker, 1980). Other research has conceptualized this nature-based social identity as a “green identity” (Whitmarsh & O’Neil, 2010) or theorized environmental identity as a form of self-identity (Stets & Biga, 2003). In both cases, self-identity and social identities have been found to predict pro-environmental behaviors (Sparks & Shephard, 1992; Stets & Biga, 2003; Visschers, Wickli, & Siegrist, 2016; Whitmarsh & O’Neil, 2010).

While some have argued that identity is reflective of other indicators such as previous behaviors, values, collective ideology, and general attitudes, environmental identity is highly correlated with pro-environmental behaviors independent of the influence of attitudes, values, and collectivist ideology (Clayton, 2003; Stets & Biga, 2003). Though this may not occur in all

contexts, Clayton (2003) argues that environmental identity influences the way in which people assess environmental problems and evaluate their solutions. Thus, an environmental identity may play a key role in influencing an individual's intention to perform specific place-protective behaviors.

Attitudes: Social Acceptability of Management

People's specific attitudes towards the landscape of the preserve and the use of active management practices may also influence place-protective behavioral intention. Within this section I will explore individuals' social acceptability of changes to the landscape that result from the use of active management practices, the public's acceptance of two widely-used managed practices, tree removal and prescribed burns, and finally discuss the potential circumstances in which individuals' attitudes towards management practices can influence their behavioral intention.

Landscape changes

Within urban contexts, people often have a strong attachment to trees (Sommer, 2003). While some believe that it is merely due to aesthetic appeal, studies have found that trees have a relaxing effect on people which can be of psychological benefit (Dwyer, Schroeder, & Gobster, 1991; Enck & Odat, 2008). This effect is stronger for late-successional forests that have higher tree density than early successional habitats that are more open (Enck & Odat, 2008; Ribe, 1990). This positive attitude towards trees and forested areas has become an area of controversy when active management activities such as tree removal are used to promote the health of a natural area or preserve (Bliss, 2000; Gobster, 1997; Gobster, 2000; Schaaf, Ross-Davis, & Broussard, 2006; Shore, 1997).

Thus, individuals' aesthetic appreciation of a less-densely forested or open landscape may influence their intention to support an actively managed preserve (Gobster, 2001). In addition to landscape changes, the public's attitudes and acceptance of the active management practices used could influence their intention to perform behaviors that support an actively managed nature preserve (Kaval, et al., 2007).

Tree removal

Tree removal has traditionally been viewed as a negative practice even if the action is done to improve the health of the ecosystem (Gobster, 1997; Gobster, 2000; Temple, 1997). Though timber harvesting has been deemed acceptable by the public in certain contexts (economic and utilitarian benefits and management), public conflict with tree removal has been found to be especially high within or near urban contexts (Bliss, 2000; Burtz & Bright, 2007; Dickie, et al., 2014; Gobster, 1997; Schaaf, et al., 2006). Dickie, et al.'s, (2014) investigation of the value of invasive trees found that values associated with trees are connected to people's opposition to tree removal more than a lack of education around the environmental benefits of removing invasive trees.

Additionally, individuals hold a range of different values for trees in urban environments that include functional, economic, aesthetic, and symbolic connections (Bliss, 2000; Gobster, 1997). For example, people may value the ecosystem services of trees, trees' ability to buffer urban environmental elements, and the perceived increases in property values associated with trees (Dickie, et al., 2014; Gobster, 2000). As a result, trees have become a part of the urban landscape identity (Dickie, et al., 2014) and changes to that landscape identity may lead to public discontent (Devine-Wright, 2009).

Prescribed burns

Another controversial management technique is the use of prescribed fire. Prescribed fire is a management practice used for a wide variety of management purposes, including but not limited to, reducing the risk of wildfires, removing unwanted species, and promoting soil nutrients (Fernandes & Botelho, 2003). While some research has shown residential opposition to prescribed burns due to health concerns from the smoke and perceived risk of property loss or damage (Vogt, 2002), individuals are generally accepting of prescribed burns, especially if they understand why it is done (Cortner, et al., 1984; Czaja, et al., 2016; Kaval, et al, 2007; McCaffrey, et al., 2013; Taylor & Daniel, 1984). The public's acceptance and support for the use of prescribed fires have been shown to translate to behavioral intention in the form of greater willingness to pay for the use of prescribed fire to reduce the risk of wildfire (Kaval, et al., 2007). The study suggests that people's attitudes towards the use of prescribed burns can influence their intention to perform place-protective behaviors.

Awareness of and attitudes towards management

Although people may hold personal attitudes about the use of tree removal, prescribed burns, or other active management practices, these attitudes may not influence their intention to support an actively managed nature preserve if they are not aware of the preserve's use of the management practices. Therefore, there may be an interaction between individuals' attitudes towards management practices and their level of awareness of the use of management practices. For example, residents holding negative attitudes who are unaware of the preserve's use of these practices may be less likely to perform behaviors that support the nature preserve. In contrast, people who are accepting of the management

practices and who are aware of the use of active management techniques may be more likely to perform behaviors that support the preserve.

Although some research has found that increased knowledge and awareness improves the public's acceptance of active management practices (Cortner, et al., 1984; Kaval, et al. 2007; Loomis, et al., 2001; McCaffrey, et al., 2013; Rogers, Hoover, & Allred, 2013; Taylor & Daniel, 1984), very little research has investigated how individuals' awareness and acceptance of these management practices in urban contexts influence their support for the natural areas in which they are used. Further, research that has explored the role of public awareness and acceptance of management practices has mainly been focused on wildfire prevention in the Western United States, but few have explored the public's acceptance of management practices in in other regions of the United States, particularly the Northeast (Bliss, 2000; Bourke & Luloff, 1994; Rogers, Hoover, & Allred, 2013).

Knowledge

Awareness of the use of active management practices is an example of systems knowledge, which is one of three different types of environmental knowledge: systems knowledge (knowledge about ecosystems and species), action-related knowledge (awareness about ways to combat environmental problems), and effectiveness knowledge (understanding how successful or effective solutions are to address the environmental problem) (Frick, et al, 2004; Kaiser & Fuhrer, 2003). While studies have found that system knowledge does not have a direct impact on a person's likelihood to perform a conservation behavior, action-related knowledge, and effectiveness knowledge have been found to directly influence an individual's performance of an environmental behavior (Frick, et al., 2004) Thus, effectiveness knowledge or perceptions of effectiveness may directly influence intention to perform place-protective behaviors.

Historically, individuals' evaluations of the cost and benefit of a behavior has been reflected as a behavioral belief that indirectly influences behavioral intention (Ajzen,1991; Fishbein & Ajzen, 2010). However, instead of assessing people's general behavioral beliefs or attitudes towards each behavior, I utilize Kaiser & Fuhrer's (2003) conceptualization of environmental knowledge as it measures an individual's assessment of which behaviors provide a greater environmental benefit.

Perceived Risk

Not only may knowledge about the nature preserve and its management influence people's intention to perform place-protective behaviors, but so may understanding the context in which the preserve is situated. The nature preserve, as a place, may be threatened or at risk because of many factors (e.g. diminishing governmental funds, public opposition, reduction in ecosystem health, and regional development). Under the protection motivation theory, awareness of threats to urban nature preserves may lead individuals to perform more place-protective behaviors. Some studies have found that when people recognize a place as threatened or in sub-optimal conditions, they are more likely to perform actions to protect that place (Finger 1994; Forsyth, et al, 2004; Stedman, 2002). For example, Stedman (2002) evaluated the intention of lakefront property owners in northern Wisconsin to perform behaviors that would protect the area from further development and promote future water quality. Property owners who perceived the place as threatened had higher intentions to perform behaviors to protect that place. Therefore, if people perceive an urban nature preserve as threatened or in sub-optimal conditions, they should have a higher intention to perform behaviors that will protect that preserve.

Spatial Distance

Residents' proximity to a preserve can influence their assessment of risks to the preserve and potentially their intention to protect the preserve. The closer individuals are to the preserve, the more they interact with it, the more likely they are to be knowledgeable of the management practices used and aware of potential threats to the preserve. As a result of proximity, individuals' specific attitudes towards the landscape and the use of management practices, and attachments, or emotional connections to the preserve may influence their intention to perform a place-protective behavior (Hinds & Sparks, 2008). Thus, I expect residents living further from the preserve to have lower intention to perform place-protective behaviors.

Personal Responsibility

Since a nature preserve is a shared resource and used by many people, there is not a guarantee that individuals may act to protect the place despite their strong attitudes, awareness, or high assessments of risk (Forsyth, et al., 2004; Story & Forsyth, 2008). Diffusion of social responsibility may occur. Given the urban context, as you increase your spatial distance from the nature preserve, the greater the chance of diffusion of responsibility as there are more potential actors who can perform the behavior (Latané & Darley, 1970). Thus, it is important to assess an individual's level of personal responsibility in addressing the problem.

Personal responsibility has been found to predict pro-environmental behavior, but responsibility is also influenced by knowledge, identity, risk, appreciation, geographic distance, and attitudes (Forsyth, et al., 2004; Gärling, Fujii, Gärling, & Jakobsson, 2003; Kaiser & Shimoda, 1999; Story & Forsyth, 2008). As previously stated, knowledge (i.e. awareness of a problem) has been found to be an indirect determinant of pro-environmental behaviors and can be mediated by

attitudes, sense of responsibility, and other factors (Bamberg & Möser, 2007; Story & Forsyth, 2008). However, even if people feel responsible to address an environmental problem through action, a person still may not perform a specific behavior if they are not aware of actions to take (action-related knowledge) or understand the effectiveness of the behavior in addressing the environmental problem (effectiveness knowledge) (Frick, Kaiser, & Wilson, 2004).

Socio-demographics

Socio-demographic factors can also predict an individual's sense of responsibility and intention to perform place-protective behaviors. The influence of socio-demographic variables changes for each contextual situation. While older research has found that gender did not significantly influence personal responsibility or behavioral intention, recent studies have found that women tend to feel a stronger sense of responsibility to address environmental problems due to their higher value of altruism, more positive environmental attitudes, and socialization to prescribed gender norms (Miller & Buys, 2008; Zelezny, Chua, & Aldrich, 2000; Zuckerman & Siegelbaum, 1977). Gender has been found to significantly predict greater responsibility for water conservation and place-protective behaviors on a neighborhood level (Miller & Buys, 2008). According to Zelezny, et al. (2000), gender differences also exist in the performance of general pro-environmental behaviors.

Other socio-demographic factors such as age, income, education, and parenthood have been investigated as predictors of responsibility, but have not been found to be significant (Miller & Buys, 2008). However, age, income, and education are weakly correlated to environmental behavior ($0.1 \leq r \leq 0.3$) (Hines, et al., 1987). Age is negatively correlated ($r=-0.151$) with environmental behavior, so younger individuals are more strongly associated with pro-environmental behaviors than are older individuals. Weak positive correlations were associated

with both income ($r= 0.162$) and education ($r=0.185$); therefore, the more educated or wealthy an individual, the stronger the association with pro-environmental behaviors (Ibid).

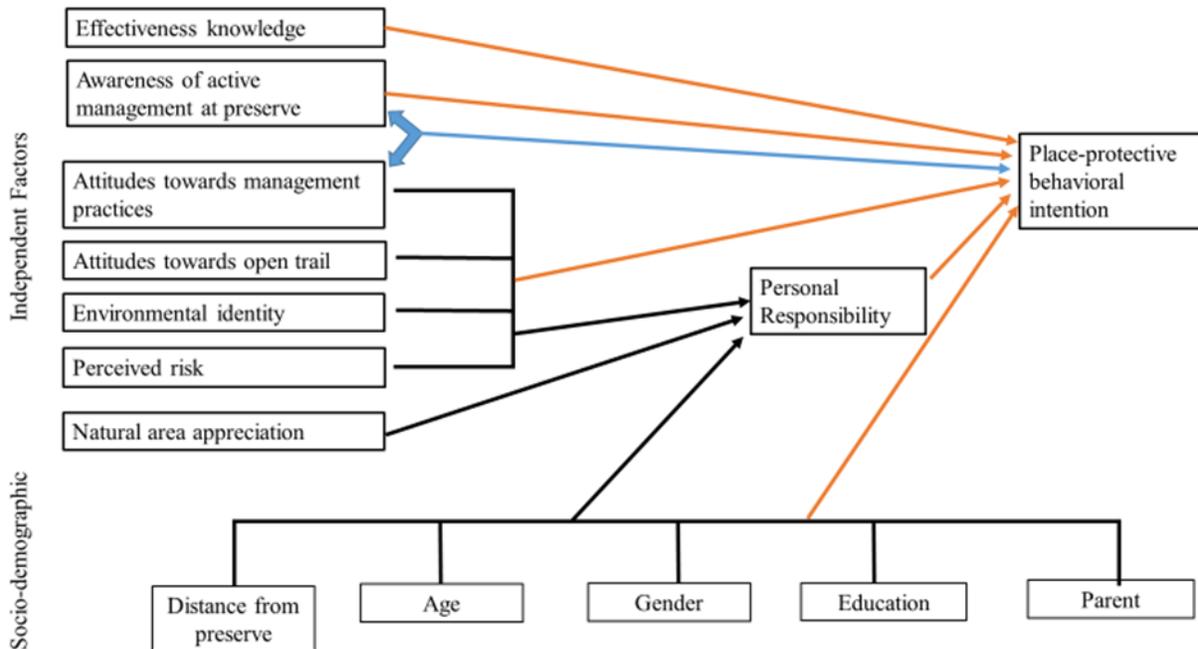
RATIONALE

While environmental identity, attitudes, knowledge, responsibility, and socio-demographic variables have been investigated as predictors of pro-environmental behavioral intention, there continues to be limited understanding about personal responsibility and place-protective behaviors for urban nature preserves. Research is especially sparse around the effect of active management strategies such as tree removal and prescribed burns on individuals' personal responsibility and likelihood to politically and civically support actively managed urban nature preserves. This study explores the public's sense of responsibility and intention to perform place-protective behaviors that support an actively managed urban nature preserve. To do this, I developed a conceptual model (*Figure 2.1*) that depicts the relationship between residents' attitudes towards active management practices and intention to perform place-protective behaviors while considering other factors important to an urban context including: perceived risk, natural area appreciation, effectiveness knowledge, environmental identity, spatial distance, and other socio-demographic variables. I sought to explore the following research questions:

1. How are individuals' attitudes towards management practices and awareness of a preserve's use of active management related to their intention to perform place-protective behaviors?
2. What is the role of environmental identity, attitudes, knowledge, perceived risk, and sense of responsibility in predicting residents' intention to perform place-protective behaviors?

3. What is the role of environmental identity, attitudes, distance, and perceived risk, in predicting residents' sense of responsibility for an actively managed nature preserve?

Figure 2.1: Model of Place-protective Behavioral Intention



Orange arrows indicate variables predicting intention to perform place-protective support behaviors. Blue arrows indicate an interaction between two variables predicting intention to perform place-protective support behaviors. Black arrows indicate variables predicting personal responsibility to support the preserve.

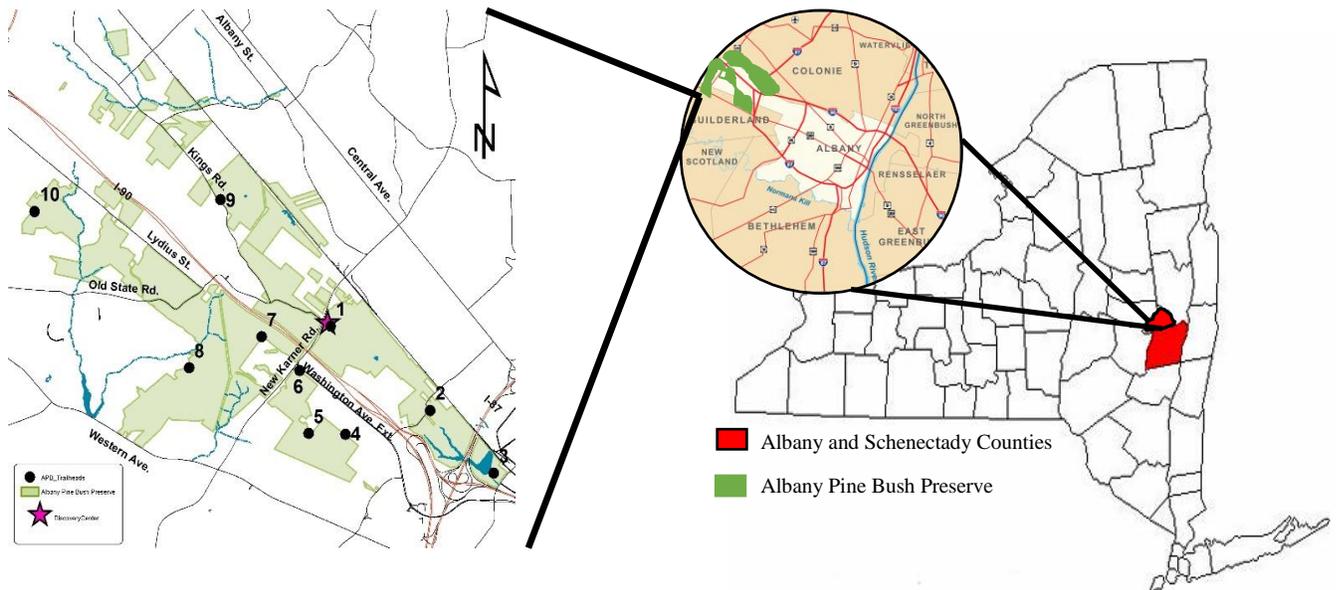
METHODS

Study Site: The Albany Pine Bush Preserve

To explore the factors predicting personal responsibility and place-protective behavioral intention, I selected a study site that was integrated into an urban interface, used active management techniques that are visible to the public, and actively educated the public about their unique ecosystem and management practices. The Albany Pine Bush Preserve (APBP) is a 3,200-acre nature preserve just north of Albany, New York. The preserve borders an urban interface

including the cities of Albany (pop. 97,856) and Schenectady (pop. 66,135) and the towns of Guilderland (pop. 35,303) and Colonie (pop. 81,591) (U.S. Census, 2015). Because land managed by the preserve is fragmented (*Figure 2.2*), there are many residential and commercial buildings that border or are within the perimeter of the preserve and in some cases, businesses are surrounded by preserve land. In addition to its focus on preservation, the preserve also has 18 miles of recreational trails within the preserve, leads many educational programs at their Discovery Center, and allows limited hunting on some portions of its land. The preserve is the home to at least 20 species that are either endangered or at-risk of becoming endangered (i.e. the Karner Blue Butterfly, Buck Moth, and the Spotted Turtle) that are reliant upon elements of the habitat (Barnes, 2003).

Figure 2.2: Map of the Albany Pine Bush Preserve



The Albany Pine Bush Preserve (APBP) is one of the world’s largest inland pine barren ecosystems in the world (Barnes, 2003). An inland pine barren is a type of early successional habitat. Early successional habitats have open landscapes as they are predominantly composed of shrubs, grasses, and small trees (Lorimer, 2001). To maintain species diversity and ecosystem health, the Albany Pine Bush Preserve like other early successional habitats, requires active

management techniques, such as the use of tree cutting, prescribed fires, and invasive species removal (Barnes, 2003). Thus, areas of the preserve are frequently changing from highly forested to open landscapes, which has caused some alarm from the public (N. Gifford, personal communication, January 21, 2016). In addition, due to the highly urbanized area surrounding the preserve, active management practices that border businesses, homes, and commercial spaces are particularly visible and have led to some opposition by community members (N. Gifford, personal communication, January 21, 2016). However, the level of overall community support for or opposition to the Albany Pine Bush Preserve and its active management techniques remains unknown (Ibid).

Procedure

This research sought to better understand residents' responsibility for actively managed urban nature preserves, their attitudes towards the management practices required to maintain the ecosystem, and residential intention to support the preserve through place-protective behaviors. I investigated the awareness, appreciation, and support of nearby residents and preserve visitors within a 10-mile radius through the implementation of mail (residents) and web (preserve visitors) surveys.

Upon receiving IRB approval (Protocol # 1008001625), residents were surveyed through a four-stage mailing of a paper survey. Individuals were selected from a stratified random sample of residential property owners within 10-miles of the Albany Pine Bush Preserve from the 2015 New York GIS Clearinghouse Database (Office of Real Property). Individuals were stratified by county population (Albany, Schenectady, Saratoga, and Rensselaer). A random sample for each county was selected proportional to their population size within the 10-mile radius of the Albany Pine Bush Preserve. A total of 1,200 residents were selected for the mail survey. They received

four personally-addressed mailings (survey and cover letter, reminder/thank you post-cards, replacement survey and cover letter, and third cover letter) every week starting September 28, 2016. The final mailing was sent on November 3, 2016 (*See Appendix A*).

To augment the response rate, residents living in municipalities adjacent to the Albany Pine Bush Preserve (i.e. Albany, Colonie, Guilderland, Niskayuna, and Schenectady) who had not responded by November 10, 2016 were identified for a drop-off mail back distribution effort. A total of 188 houses were identified for the drop-off mail back distribution. A team of two individuals drove to houses from 9am until 5pm from November 12-13, 2016. One individual, identified as a Cornell University representative, approached the house with a clear handled bag containing a copy of the mail survey and a brightly colored cover letter (*Appendix A*). I knocked or rang the doorbell twice waiting for an individual to answer the door. If someone answered, I explained the survey and left them with instructions for returning the survey. However, if there was no answer, a copy of the survey was left hanging on their door. I then recorded whether 1) the survey was left on the door (i.e. delivered), 2) I spoke to the resident (interaction), or 3) if the survey was undeliverable (i.e. lack of access due to security or wrong address). A total of 172 houses were visited.

For the visitor oversample, the Albany Pine Bush Preserve provided me with a list of visitors who had either checked into the preserve's education center or attended a preserve-led program in the last three years (2013-2016). The list had a total of 4,609 preserve visitors which was used as the sampling frame for the web survey. Individuals living out of state or without valid email addresses were removed from the sampling frame. A list of preserve visitors living in municipalities within 10 miles of the preserve (n= 3,835) were separated from those who lived more than 10 miles away from the preserve (n=515). Those living further than 10 miles were

excluded from my analysis. A random sample of visitors living within 10-miles of the preserve (n = 1,400) were contacted via email through a Qualtrics web survey. Individuals from the visitor oversample were sent the same cover letters as the mail participants and were contacted four times with the initial letter and survey invitation sent by email on October 6, 2016. The final email reminder was sent on November 16, 2016 (*Appendix A*). Preserve visitors were given the same survey as mail participants, but were also asked the municipality in which they currently lived.

Finally, to create a single dataset for analyses, I combined the mail survey visitor and web survey visitor samples. To account for non-response bias, short (5 minute) non-response telephone surveys were conducted with non-respondents to both the web (n=50) and mail (n= 50) surveys from December 5-13, 2016. The survey included a subset of the socio-demographic, visit, and behavior questions from the original survey (*Appendix B*).

Measures

Summative scales were constructed with survey items for other variables using principal component analysis. Because the scales I used were developed from previously tested scales, items were grouped based upon theoretical merit to reduce the number of items examined in the principal component analysis. Theory-based item groups with 5 or more items were analyzed using exploratory principal component analysis to assess whether they measured multiple or single constructs. Scales were developed based upon their factor loading and reliability values. Full scales can be found in the tables in *Appendix C*.

Place-protective behavioral intention

I created a scale of place-protective behaviors based on items used in Halpenny (2010) and from semi-structured interviews with staff, residents, and visitors. Using a 5-point Likert

Scale, respondents were asked how much they agreed with the statement, “In the next 12 months, I intend to...”. Respondents then reported their agreement with six different behaviors. The six-item scale was comprised of three political behaviors (i.e. write letters of support, donate money, volunteer) and three civic behaviors (i.e. visit the preserve, attend preserve program, and talk positively about the preserve). The behavioral intention scale was reliable ($\alpha = 0.872$).

Personal responsibility

To assess an individual’s responsibility to support the Albany Pine Bush Preserve participants were asked to the extent in which they agreed or disagreed with two items “I feel a personal responsibility to support management practices that promote habitat at the Albany Pine Bush preserve” and “I feel a personal responsibility to support the Albany Pine Bush Preserve”. The scale had a Cronbach’s alpha reliability of 0.872.

Perceived risk:

A six-item perceived risk scale was created to identify participants’ perceptions of the severity of various risks to the preserve. Using a 5-point scale from “None” to “Very High”, respondents assessed how much risk each of the following items pose to the Albany Pine Bush Preserve: residential development, commercial development, lack of financial support, lack of use/visitors, non-sanctioned use of the preserve, and extinction of rare plants and animals in the preserve. These items were compiled from interviews with residents, visitors, and APBP staff members to create the perceived risk scale ($\alpha = 0.816$).

Knowledge:

Effectiveness knowledge

To investigate individuals' level of effectiveness knowledge, they were asked how effective specific behaviors were at supporting nature preserves. Participants rated items on a 5-point Likert scale from "Very Ineffective" to "Very Effective". This six-item scale ($\alpha = 0.852$) reflected the six behaviors on the place-protective behavioral intention scale. Three items were political behaviors and three items reflected civic behaviors (*See place-protective behavioral intention*).

Awareness of Management Practices

Participants were asked to identify the types of management practices used to maintain the ecological health of the Albany Pine Bush Preserve. Items were coded "0" if they did not identify the practice and "1" if they successfully identified the use of the management practice. A summative knowledge scale ($\alpha = 0.829$) was constructed of the four management practices (i.e. invasive removal, cutting trees, mowing, and controlled burns).

Attitudes:

Attitudes towards open trails

To create a construct that measured individuals' attitudes towards open landscapes, items were taken from Taylor & Daniel's (1984) investigation into the public's evaluations of natural areas after light and severe fires. For my evaluation, an image of an open field with shrubs and sparse trees was presented to the participants (*Appendix C*). The image was taken at a restored portion of the Albany Pine Bush Preserve. Participants were then asked to indicate how much they agreed or disagreed with four

items: “I find this space appealing to look at”, “I find this space to be very natural”, “I am very likely to use this space for recreation”, and “I think this space looks healthy”.

The Cronbach’s alpha for the open trail scale was 0.875.

Attitudes towards management practices

Participants’ attitudes towards management practices were measured using a four-item scale ($\alpha=0.787$) that investigated how they felt about the use of certain management practices in natural areas. Individuals were asked about four management practices: the removal of non-native plants and trees, cutting trees to create openings in the forest, mowing of bushes and small trees, and controlled burns (i.e. low-intensity fire). Responses were measured with a 5-point Likert scale from “Very Negative” to “Very Positive”.

Natural area appreciation

A four-item scale was created to gauge individuals’ general appreciation of natural areas. Similar to Forsyth, et al. (2004), individuals were asked to the extent that they agreed or disagreed whether it was important to protect: “rare natural areas”, “natural areas that are not intended for human use”, “natural areas that support rare plants and animals”, and “natural areas in urban regions”. The general appreciation scale was reliable with a Cronbach’s alpha reliability score of 0.838.

Environmental identity

An environmental identity scale was constructed using five items from Clayton (2003) and two items related to species values from Kotchen & Reiling (2000). The following seven items were included: “I spend a lot of my time in natural settings (woods, ocean, mountains,

lake, desert)”, “I think of myself as a part of nature not separate from it, Engaging in environmental behaviors is important to me”, “If I had enough time and money, I would definitely devote some of it to environmental causes”, “I would feel that an important part of my life would be missing if I was not able to get out and enjoy nature from time to time”, The species values questions included were “Plants and animals have as much right as humans to exist”, “I value the existence of endangered species”. Together the environmental identity scale had a Cronbach’s alpha reliability score of 0.852.

Socio-demographic variables and their transformation

Distance from Preserve

I categorized an individual’s distance from the preserve based upon the municipality in which they reside (city, town, hamlet, or village). Using QGIS, I created a 5-mile and 10-mile buffer around the Albany Pine Bush Preserve. With U.S. Census data, I identified the municipalities that uniquely fell within 5 miles, between 5-10 miles, or <10 miles of the preserve. Based upon their reported municipality of residence, individuals were coded “0” if they lived within 5 miles of the preserve, “1” if they lived between 5 and 10 miles, and excluded if they lived more than 10 miles of the preserve.

Gender

Participants were asked “What is your gender?” and given the options “Male”, “Female”, and “Other”. Individuals were coded “0” for male, “1” for female, and “2” for other. Due to the low response of “Other” (n=1), respondents indicating “Other” were excluded from the analysis

Age

Participants reported the year in which they were born. To transform the variable so that it reflected an increase in age, we subtracted participants' birthyear from 2016. Respondents who were under the age of 18 were removed from the sample.

Education

I measured participants' level of education by asking them to select the highest level of education they completed out of a six-point scale. Participants were given the following options: "Less than high school diploma" (1), "High school diploma" (2), "Some college" (3), "2-year college degree" (4), "4-year college degree" (5), and "Graduate/ Professional degree" (6).

Parent

Survey respondents also reported whether they had children. Individuals who did not have children were coded "0" and those who did have children were coded "1".

Data Analysis

I performed t-tests and chi-squared analysis on the socio-demographic variables for both the mail and web samples to see if there were significant statistical differences that would prevent me from combining the two samples. In addition, respondents were compared to non-respondents across socio-demographic, visitor, and place-protective behavioral intention variables. Means and standard deviations were assessed with t-tests for continuous variables and chi-squared tests were performed on categorical variables. No significant differences were found between the respondents and non-respondents for either the mail or web survey (*Appendix B*).

To investigate the predictive power of individuals' attitudes towards management on place-protective behavioral intention, I chose to run a simple multiple linear regression model with an interaction. Following the simple model, I then added other independent variables (i.e. personal responsibility, perceived risk, effectiveness knowledge, attitudes towards open trails, and environmental identity) to the model. Socio-demographic variables were also included in the full model. Finally, to explore what factors predicted residents' personal responsibility, I ran a multiple linear regression model using perceived risk, attitudes towards open trails, attitudes towards management practices, natural area appreciation, and environmental identity as independent variables. In addition, I ran the model with socio-demographic variables.

Prior to running each regression, I checked the assumptions of the linear model. I confirmed that the residuals were normally distributed for each model, and that there were no outliers. In addition, I checked for multi-collinearity in all models. Variable transformations were necessary for the model predicting personal responsibility and are explained below. A correlation matrix of all the independent variables can be found in *Appendix D*.

RESULTS

I received 188 (23.6%) mail surveys and 246 (20.1%) web surveys. Of the completed mail surveys, 165 were received from the four-step mailing process, and 24 were received following the drop-off mail-back process. Since there were no significant socio-demographic differences between the two samples, the web and mail samples were combined into a single 434 respondent dataset with a total response rate of 21.9%.

Data Transformations

I analyzed plots of all variables and found that the personal responsibility, effectiveness knowledge, perceived risk, and natural area appreciation variables were negatively skewed indicating that many respondents had high ratings for each of these factors. Due to the distribution of personal responsibility, effectiveness knowledge, perceived risk, and appreciation, these variables were transformed into dichotomous variables. For personal responsibility, effectiveness knowledge, and perceived risk scales, responses less than four were coded as “low” and responses greater than or equal to four were coded as “high”. For appreciation, all participants who responded with a “5” (Strongly Agree) on the scale were coded as “high appreciation” and responses less than five on the five-point scale were coded as “low appreciation”. All the new dichotomous variables were dummy coded “0” for their low categories and “1” for their high categories. The dummy coding allowed us to include them in the regression analyses.

Respondent Characteristics

Survey respondents were primarily White (93.9%) and on average 56 years old ($SD = 14.7$). They were highly educated with 74% of them attaining a 4-year college degree or higher. Forty percent of respondents had a household income of \$100,000 or greater. Fifty-seven percent of the respondents were female and 71% of all respondents had children. More than half (64.4%) of the responding individuals lived within five miles of the Albany Pine Bush Preserve and thirty-five percent lived between 5 and 10 miles of the preserve. Most participants (78%) had visited the preserve; however, many non-visitors had at least heard of the preserve (21%). Individuals were quite knowledgeable about the use of active management practices at the preserve. Over 70% of respondents could identify two or more of the active management techniques used by the Albany Pine Bush Preserve. Descriptive statistics of all variables can be found in *Table 2.1*.

Table 2.1: Means and percentages for dependent and independent variables and demographics (Bolded items are reference categories)

Variable	Mean (SD) and Percentages
Place-protective behavioral intention ¹	3.03 ± 0.91
Personal responsibility ¹	
Low (0-3.99)	146 (34.89%)
High (4-5)	252 (65.1%)
Perceived risk ³	
Low (0-3.99)	142 (36.39%)
High (4-5)	154 (63.61%)
Environmental identity ¹	4.2 ± 0.65
Awareness of management practices	2.47 ± 1.5
Effectiveness knowledge	
Low (0-3.99)	65 (15.88%)
High (4-5)	310 (84.12%)
Attitude towards open trail ¹	3.92 ± 0.82
Attitude towards management practices ¹	3.48 ± 0.75
Distance from preserve	
<5 miles	241 (64.4 %)
5-10 miles	133 (35.6%)
Gender	
Male	157 (42.8%)
Female	209 (57.0%)
Age	55.6 ± 14.70
Education ⁴	4.96 ± 1.25
Parent	
No	109 (29.3%)
Yes	263 (70.7 %)

¹ Response Categories 1= Strongly Disagree 2=Disagree, 3= Neutral, 4=Agree, 5 =Strongly Agree

² Response Categories 1 =Very Ineffective, 2=Slightly Ineffective, 3= Neither, 4=Slightly Effective, 5= Very Effective

³ Response Categories 1=None, 2=Low, 3= Medium, 4= High, 5= Very High

⁴ Response Categories 1 = Less than high school diploma, 2 = High school diploma, 3= Some college, 4= 2-year college degree, 5 = 4-year college degree, 6 = Graduate/ Professional degree

Public Attitudes and Awareness of Management

To investigate how residents' attitudes towards the use of management practices and their awareness of a preserve's use of active management are related to their intention to perform place-protective behaviors, I first explored whether there was a relationship in a simplified linear regression model. I investigated the predictive power of individuals' awareness of the APBP's use of active management practices, their general attitudes towards the use of active management practices, and an interaction between respondents' awareness and attitudes on their intention to perform place-protective behaviors. The model explained 11% of the variance in place-protective behavioral intention (Adjusted $R^2=0.11$, VIF=1.14). I found that there were no main effects for residents' awareness of the management practices or attitudes towards management practices. However, I did find that the interaction between awareness and attitudes towards management practices was a significant predictor ($\beta=0.09$, $p<0.05$) of intention to perform place-protective behaviors (See Table 2.2). As individuals held more positive attitudes towards the use of active management practices and became more aware about the APBP's use of the active management practices, their intention to perform place-protective behaviors increased.

Table 2.2: Simple model of awareness and attitudes towards management practices with an interaction on intention to perform place-protective behaviors

	Coefficient	SE	p-value
Intercept	2.93	0.41	<0.001***
Awareness of management APBP ¹ practices	-0.15	0.38	0.2815
Attitudes towards management practices	-0.09	0.28	0.4880
Interaction: Awareness of APBP ¹ management practices~ Attitudes towards management practices	0.09	0.04	0.0264*

R²=0.12 Adjusted R²=0.11 df=365 F-Statistic=16.64 VIF=1.14

*= $p < 0.05$, **= $p < 0.01$, ***= $p < 0.001$

¹ Albany Pine Bush Preserve

Place-Protective Behavioral Intention to Support the Albany Pine Bush Preserve

Although the interaction between individuals’ attitudes towards management practices and their awareness of the preserve’s use was a significant predictor of behavioral intention in a simplified model, I sought to explore if residents’ attitudes towards management practices remained a significant predictor of behavioral intention in a full model with other independent variables. I explored the extent to which individuals’ intention to perform place-protective behaviors was explained by responsibility, perceived risk, knowledge, attitudes, and environmental identity. I examined these relationships using a multiple linear regression that also included socio-demographic variables (i.e. gender, education, distance from preserve, age, and children). Six variables significantly predicted intention to perform place-protective behaviors

(See Table 2.3). Overall, the multiple linear regression model predictors accounted for 49% of the variation in behavioral intention (Adjusted $R^2=0.49$, VIF=2.06).

I found that residents who reported high responsibility ($\beta=0.60$, $p<0.001$) indicated higher intentions to perform place-protective behaviors. Residents' perceptions of risk ($\beta=0.16$, $p>0.05$) did not significantly predict their intention to support the preserve. However, effectiveness knowledge ($\beta=0.33$, $p<0.05$) was a significant predictor of behavioral intention. Awareness of management practices, attitudes towards open trails, attitudes towards management practices, and environmental identity were not significant predictors of place-protective behavioral intention (See Table 2.3). I found that once other predictor variables were added to the model, the interaction between awareness and attitudes towards management practices was no longer significant.

With respect to the socio-demographic variables, I found an individual's distance from the nature preserve ($\beta= -0.27$, $p<0.01$) significantly predicted an individual's intention to support the nature preserve. As you moved from less 5 miles to 5-10 miles away from the preserve, residents' intention to perform place-protective behaviors significantly decreased. Women had significantly higher intention to support the nature preserve than men ($\beta= 0.23$, $p<0.01$). The older the individuals ($\beta=-0.01$, $p<0.01$), the lower their intention to perform place-protective behaviors (Table 2.3). Education and parent were the only socio-demographic variables that did not significantly predict intention to support the Albany Pine Bush Preserve.

Table 2.3: Full multiple linear regression model for place-protective behavioral intention

	Coefficient	SE	p-value
Intercept	0.98	0.62	0.124
Personal responsibility	0.60	0.10	<0.001***
Perceived risk	0.16	0.08	0.054
Effectiveness knowledge	0.33	0.12	0.008**
Awareness of APBP ¹ management practices	0.15	0.13	0.272
Attitude towards open trail	0.11	0.06	0.091
Attitude towards management practices	0.13	0.12	0.269
Environmental identity	0.23	0.08	0.004**
Distance from preserve	-0.27	0.09	0.002**
Gender	0.23	0.09	0.010**
Age	-0.01	0.00	0.002**
Education	-0.04	0.04	0.287
Parent	-0.01	0.09	0.353
Interaction: Awareness of APBP ¹ management practices ~ Attitudes towards management practices	-0.02	0.4	0.552

R²=0.636 Adjusted R²=0.485 df= 191 F-Statistic=18.05 VIF=2.06

*= $p < 0.05$, **= $p < 0.01$, ***= $p < 0.001$

¹ Albany Pine Bush Preserve

Personal Responsibility to Support the Albany Pine Bush Preserve

My final research question explored the predictive power of perceived risk, attitudes, and environmental identity on personal responsibility with a regression model. Since the responsibility variable was transformed into a dichotomous variable, I utilized a binary logistic regression model for the analysis (*Table 2.4*). Socio-demographic variables (i.e. gender, education, distance from preserve, age, and parent) were also included in the model. The logistic regression model for personal responsibility fit the data well with a Nagelkerke R² of 0.43.

Table 2.4: Parameter estimates, standard errors, and odds ratios from binary logistic regression model of personal responsibility

	Coefficient	Odds Ratio	SE	p-value
Intercept	-13.86	<0.001	2.41	<0.001***
Perceived risk	0.23	1.26	0.33	0.479
Attitude towards open trail	0.66	1.93	0.24	0.007**
Attitudes towards management practices	0.59	1.79	0.25	0.019*
Natural area appreciation	0.49	1.63	0.36	0.168
Environmental identity	1.89	6.65	0.33	<0.001***
Distance from preserve	-0.27	0.76	0.35	0.437
Gender	-0.05	0.95	0.35	0.878
Age	0.02	1.02	0.01	0.119
Education	0.14	1.14	0.16	0.392
Parent	-0.11	0.90	0.39	0.783

Nagelkerke's Pseudo $R^2=0.427$ $df=240$ $*=p<0.05$, $**=p<0.01$, $***p<0.001$

Perceived risk and natural area appreciation were not predictive of high personal responsibility for the Albany Pine Bush Preserve. However, for every increase in the strength of residents' environmental identity (odds ratio = 6.65, $p<0.001$), their likelihood of feeling a strong sense of personal responsibility for the nature preserve was over six and a half times more likely. Further, individuals who held positive attitudes towards management practices (odds ratio = 1.79, $p<0.05$) were almost twice as likely to feel a high sense of responsibility. Finally, respondents who had positive attitudes towards the open landscape and trails (odds ratio = 1.93, $p<0.01$) were about twice as likely to feel a high sense of responsibility for the preserve. None of the socio-demographic variables (i.e. distance from preserve, gender, age, or education) were found to be significant predictors of personal responsibility.

DISCUSSION

Active Management on Place-protective Behaviors and Responsibility

On average, residents held neutral to positive attitudes towards a variety of management practices including prescribed burns and tree removal (*Table 2.1*). This supports earlier findings of the public's acceptance of tree removal in the Midwestern United States (Rogers, Hoover, Allred, 2015). I found that attitudes towards management practices do not directly predict residents' intention to support an actively managed nature preserve. Instead, residents' attitudes towards management practices predicted their intention to perform place-protective behaviors only if they were also aware of the preserve's use of management practices. However, the predictive power of the interaction was no longer significant in a full model with other predictors. According to APBP staff, the public's discontent with the use of prescribed burn or tree removal has led some people to call the preserve staff to voice their concerns (N. Gifford, personal communication, January 21, 2016). While vocal residents expressed discontent, a stratified random sample of residents indicates that this is not a widely held viewpoint. Instead, my findings suggest that residents generally held positive attitudes towards the use of management practices and these attitudes were not predictive of behavioral intention. Further, residents' value of the preserve may outweigh their discontent with the management practices.

The lack of significance of the interaction effect in the full model suggests that other factors were stronger predictors of individuals' place-protective behavioral intention than their awareness of management practices and attitudes towards the management practices. Specifically, my findings support a strong relationship between personal responsibility place-protective behavioral intention (Story & Forsyth, 2008). Upon further examination into the factors that predicted personal responsibility, I found that people with strong positive attitudes towards the use of active

management practices in nature preserves held high levels of responsibility for the Albany Pine Bush Preserve. Thus, suggesting that responsibility may mediate the relationship between individuals' attitudes towards management practices and their intention to perform place-protective behaviors.

Predicting Place-protective Behavioral Intention for Actively Managed Nature Preserves

While individuals' awareness about the preserve's use of management practices did not have a direct relationship with their intention to perform place-protective behaviors, effectiveness knowledge was a significant predictor of place-protective intention. Awareness of the preserve's use of active management could be categorized as systems knowledge as it describes the elements necessary to promote the health of the system. Similar to Frick, et al. (2004), my results suggest that effectiveness knowledge has a more direct influence on individual's intention to perform pro-environmental behaviors than systems knowledge.

Further exploration into individuals' distance from the preserve found that residents living closer to the preserve were more likely to perform place-protective behaviors. While the data initially suggested that a diffusion of responsibility effect may be present, distance from the preserve, was not a significant predictor of responsibility. Thus, the findings do not support the diffusion of responsibility (Latané & Darley, 1970). Instead, distance from the preserve may relate to other variables that influence place-protective behavioral intention such as frequency of visitation and place attachment (Halpenny, 2010; Wynveen, et al., 2011). However, those variables were not investigated in this study and could be explored in future studies of place-protective behaviors.

Despite literature illustrating the influence of perceived risk and attitudes on behavior (Brewer, Weingstein, Cuite, & Herrington, 2004; Fishbein & Ajzen, 2010; Milne, Sheerna, & Orbell, 2000; Rogers, 1975), neither perceived risk nor any of the attitudes measured (e.g. attitudes towards management practices and attitudes towards open trails) were significant predictors of place-protective intention. Instead, environmental identity was a strong predictor of both behavioral intention and personal responsibility. This supports Clayton's (2003) findings that environmental identity can be an independent predictor of pro-environmental behaviors. Since environmental identity can be characterized as a social identity, individuals' personal responsibility to protect the Albany Pine Bush Preserve, could have stemmed from their desire to perform behaviors in accordance with the perceived group identity.

Finally, in accordance with Miller & Buys (2008), this study found that younger individuals and women have higher intention to perform place-protective behaviors than do older individuals or males. These people may be important to target when aiming to garner support. In addition, this study suggests that activating residents' environmental identity may significantly increase their sense of responsibility for and intention to support an actively managed urban nature preserve. Moreover, despite residents identifying high risk of threats to the preserve, their perceptions of this risk were not predictive of their intention to perform place-protective behaviors. Thus, risk-based messages to protect the preserve from urbanization and other threats may not be as effective as messages aimed towards activating people's environmental identities. Appeals to residents' environmental identities may be particularly influential since most of the respondents living near the preserve identified with an environmental identity and felt a high level of responsibility to protect the urban nature preserve.

Responsibility for Actively Managed Nature Preserves

The strongest predictor of place-protective behavior in support of an actively managed urban nature preserve was an individual's sense of personal responsibility for the preserve. This study found that residents' sense of personal responsibility for the preserve was predicted by their environmental identity, attitudes towards the aesthetics of the habitat, and attitudes towards the use of management practices in nature preserves. This suggests that residents' sense of responsibility could be tied to environmental stewardship and people's relationship to the preserve. I found that overall individuals may feel an environmental responsibility to protect the preserve (*Table 2.1*). While studies suggest that urban residents are likely to engage in environmental stewardship if the land is threatened or damaged (Tidball & Krasny, 2007; Krasny & Tidball, 2012), I found that people's perceptions of risk was not predictive of their responsibility to support the preserve or their intention to perform place-protective behaviors. Instead, residents' environmental identity was predictive of both their responsibility to support the preserve and their intention to perform place-protective behaviors.

Limitations and Future Research

This study explored how residents' attitudes towards the use of active management practices and other factors influenced their intention to perform place-protective behaviors for an actively managed preserve. The findings revealed that the influence of individuals' attitudes towards active management on behavioral intention differed between the simple and full model. Therefore, more extensive research into whether individuals' attitudes towards management practices influence their behaviors in different contexts should be explored. With respect to the influence of other factors on place-protective behavioral intention, the study focused on one actively managed urban nature preserve and the findings may not be generalizable to other urban

contexts with different socio-demographic makeups and various threats to the nature preserve. Future research could focus on better understanding how urban residents' environmental identity, perceptions of risk, and personal responsibility influence their behaviors around other nature preserves. Finally, this analysis did not assess individuals' affective responses to the preserve or their interactions with the preserve. Therefore, future research could investigate how people's interactions with and attachments to actively management urban nature preserves influence their intention to perform place-protective behaviors and the predictive power of environmental identity.

CONCLUSION

Overall, this study found that local residents were likely to protect an actively managed urban nature preserve that utilized controversial active management practices. My findings suggest that land managers and environmental educators interested in garnering support for an actively managed urban nature preserve use outreach and communication materials that encourage a sense of responsibility for the preserve. Specifically, messages and materials that activate an individual's environmental identity may be more effective than messages that emphasize the threats to the urban nature preserve. Further, outreach may be the best received by people living the closest to the preserve, younger individuals, and females, since distance from the preserve, age, and gender were also found to be significant predictors of place-protective behaviors.

REFERENCES

- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and Human Decision Processes*, 50(2), 179-211.
- Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, 27(1), 14-25.
- Barnes, J. K. (2003). *Natural history of the Albany Pine Bush*. Albany, NY: New York State Museum.
- Beatley, T. (2009). Biophilic urbanism: Inviting nature back to our communities and into our lives. *William & Mary Environmental Law and Policy Review*, 34(1), 209.
- Beatley, T. (2011). *Biophilic cities: integrating nature into urban design and planning*. Washington, DC: Island Press.
- Becker, R. (2001, November 21). Ban on shrub clearing lifted. Retrieved from http://articles.chicagotribune.com/2001-11-21/news/0111210038_1_preserves-restoration-projects-stroger
- Bliss, J. C. (2000). Public perceptions of clearcutting. *Journal of Forestry*, 98(12), 4-9.
- Bliss, J. C., Nepal, S. K., Brooks, R. T., & Larsen, M. D. (1997). In the mainstream: Environmental attitudes of Mid-South forest owners. *Southern Journal of Applied Forestry*, 21(1), 37-43.
- Bourke, L., & Luloff, A. E. (1994). Attitudes toward the management of nonindustrial private forest land. *Society & Natural Resources*, 7(5), 445-457.
- Brandon, K., Redford, K. H., & Sanderson, S. (Eds.). (1998). *Parks in peril: people, politics, and protected areas*. Washington, DC: Island Press.

- Brewer, N. T., Weinstein, N. D., Cuite, C. L., & Herrington, J. E. (2004). Risk perceptions and their relation to risk behavior. *Annals of Behavioral Medicine*, 27(2), 125-130.
- Bright, A. D., Barro, S. C., & Burtz, R. T. (2002). Public attitudes toward ecological restoration in the Chicago metropolitan region. *Society & Natural Resources*, 15(9), 763-785.
- Burtz, R. T., & Bright, A. D. (2007). Integrative Complexity and Attitudes Toward Fire Management in the Wildland Urban Interface. *Journal of Park & Recreation Administration*, 25(4), 99-116.
- Clayton, S. D. (2003). Environmental Identity: A conceptual and an operational definition. In S. Clayton & S. Opatow (Eds.), *Identity and the natural environment: The psychological significance of nature* (pp. 45-66). Cambridge, MA: MIT Press.
- Cooper, C., Larson, L., Dayer, A., Stedman, R., & Decker, D. (2015). Are wildlife recreationists conservationists? Linking hunting, birdwatching, and pro-environmental behavior. *The Journal of Wildlife Management*, 79(3), 446-457.
- Cortner, H. J., Zwolinski, M. J., Carpenter, E. H., & Taylor, J. G. (1984). Public support for fire-management policies. *Journal of Forestry*, 82(6), 359-361.
- Czaja, M. R., Bright, A. D., & Cottrell, S. P. (2016). Integrative complexity, beliefs, and attitudes: Application to prescribed fire. *Forest Policy and Economics*, 62, 54-61.
- Devine-Wright, P. (2009). Rethinking NIMBYism: The role of place attachment and place identity in explaining place-protective action. *Journal of Community & Applied Social Psychology*, 19(6), 426-441.
- Devine-Wright, P., & Howes, Y. (2010). Disruption to place attachment and the protection of restorative environments: A wind energy case study. *Journal of Environmental Psychology*, 30(3), 271-280.

- Dickie, I. A., Bennett, B. M., Burrows, L. E., Nuñez, M. A., Peltzer, D. A., Porté, A., Richardson, D., Rejmanek, M., Rundel, P., & van Wilgen, B. W. (2014). Conflicting values: ecosystem services and invasive tree management. *Biological Invasions*, *16*(3), 705-719.
- Dwyer, J. F., Schroeder, H. W., & Gobster, P. H. (1991). The significance of urban trees and forests: toward a deeper understanding of values. *Journal of Arboriculture*, *17*(10), 276-284.
- Enck, J., & Odató, M. (2008). Public attitudes and affective beliefs about early-and late-successional stages of the Great Northern Forest. *Journal of Forestry*, *106*(7), 388-395.
- Fernandes, P. M., & Botelho, H. S. (2003). A review of prescribed burning effectiveness in fire hazard reduction. *International Journal of Wildland Fire*, *12*(2), 117-128.
- Finger, M. (1994). From knowledge to action? Exploring the relationships between environmental experiences, learning, and behavior. *Journal of Social Issues*, *50* (3), 141–160.
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York, NY: Taylor & Francis Group.
- Forman-Cook, W. C., Malmshemer, R. W., & Germain, R. H. (2015). Local regulation of timber harvesting in New York State. *Forest Science*, *61*(6), 1079-1087.
- Forsyth, D. R., Garcia, M., Zyzniewski, L. E., Story, P. A., & Kerr, N. A. (2004). Watershed pollution and preservation: The awareness–appraisal model of environmentally positive intentions and behaviors. *Analyses of Social Issues and Public Policy*, *4*(1), 115-128.

- Frick, J., Kaiser, F. G., & Wilson, M. (2004). Environmental knowledge and conservation behavior: Exploring prevalence and structure in a representative sample. *Personality and Individual Differences, 37*(8), 1597-1613.
- Gärling, T., Fujii, S., Gärling, A., & Jakobsson, C. (2003). Moderating effects of social value orientation on determinants of proenvironmental behavior intention. *Journal of Environmental Psychology, 23*(1), 1-9.
- Gobster, P. H. (1997). The Chicago wilderness and its critics: the other side: a survey of arguments. *Restoration and Management Notes, 15*(1), 33-38.
- Gobster, P. H. (2000). Restoring nature: Human actions, interactions, and reactions. In P. H. Gobster & R. B. Hull (Eds.), *Restoring nature: Perspectives from the social sciences* (pp.1-19). Washington, DC: Island Press.
- Gobster, P. H. (2001). Visions of nature: conflict and compatibility in urban park restoration. *Landscape and Urban Planning, 56*(1), 35-51.
- Grumbine, R. E. (1994). What is ecosystem management?. *Conservation Biology, 8*(1), 27-38.
- Halpenny, E. A. (2010). Pro-environmental behaviours and park visitors: The effect of place attachment. *Journal of Environmental Psychology, 30*(4), 409-421.
- Hinds, J., & Sparks, P. (2008). Engaging with the natural environment: The role of affective connection and identity. *Journal of Environmental Psychology, 28*(2), 109-120.
- Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *The Journal of Environmental Education, 18*(2), 1-8.
- Kaiser, F. G., & Fuhrer, U. (2003). Ecological behavior's dependency on different forms of knowledge. *Applied Psychology, 52*(4), 598-613.

- Kaiser, F. G., & Shimoda, T. A. (1999). Responsibility as a predictor of ecological behaviour. *Journal of Environmental Psychology, 19*(3), 243-253.
- Kaval, P., Loomis, J., & Seidl, A. (2007). Willingness-to-pay for prescribed fire in the Colorado (USA) wildland urban interface. *Forest Policy and Economics, 9*(8), 928-937.
- Kotchen, M. J., & Reiling, S. D. (2000). Environmental attitudes, motivations, and contingent valuation of nonuse values: a case study involving endangered species. *Ecological Economics, 32*(1), 93-107.
- Krasny, M. E., & Tidball, K. G. (2012). Civic ecology: a pathway for Earth Stewardship in cities. *Frontiers in Ecology and the Environment, 10*(5), 267-273.
- Larson, L. R., Stedman, R. C., Cooper, C. B., & Decker, D. J. (2015). Understanding the multi-dimensional structure of pro-environmental behavior. *Journal of Environmental Psychology, 43*, 112-124.
- Latané, B., & Darley, J. M. (1970). *The unresponsive bystander: Why doesn't he help?*. New York, NY: Appleton-Century-Crofts.
- Loomis, J. B., Bair, L. S., & González-Cabán, A. (2001). Prescribed fire and public support: Knowledge gained, attitudes changed in Florida. *Journal of Forestry, 99*(11), 18-22.
- Lorimer, C. G. (2001). Historical and ecological roles of disturbance in eastern North American forests: 9, 000 years of change. *Wildlife Society Bulletin, 29*(2), 425-439.
- McCaffrey, S., Toman, E., Stidham, M., & Shindler, B. (2013). Social science research related to wildfire management: an overview of recent findings and future research needs. *International Journal of Wildland Fire, 22*(1), 15-24.

- Miller, E., & Buys, L. (2008). The role of social capital in predicting and promoting 'feelings of responsibility' for local environmental issues in an Australian community. *Australasian Journal of Environmental Management*, 15(4), 231-240.
- Milne, S., Sheeran, P., & Orbell, S. (2000). Prediction and intervention in health-related behavior: A meta-analytic review of protection motivation theory. *Journal of Applied Social Psychology*, 30(1), 106-143.
- Monroe, M. C. (2003). Two avenues for encouraging conservation behaviors. *Human Ecology Review*, 10(2), 113-125.
- Mortimer, M. J., Stull, L., Prisley, S., & Slack, D. (2006). Forest-related ordinances in Virginia: A case study in regulatory de-evolution. *Southern Journal of Applied Forestry*, 30(4), 196-205.
- Neil Gifford (Conservation Director of Albany Pine Bush) in discussion with Sarah Naiman, January 21, 2016.
- Pretty, J. (2004). How nature contributes to mental and physical health. *Spirituality and Health International*, 5(2), 68-78.
- Ribe, R. G. (1990). A general model for understanding the perception of scenic beauty in northern hardwood forests. *Landscape Journal*, 9(2), 86-101.
- Rogers, C. R. (1975). Empathic: An unappreciated way of being. *The Counseling Psychologist*, 5(2), 2-10.
- Rogers, S. C., Hoover, W. L., & Allred, S. B. (2013). Public acceptability of forest management practices at Morgan-Monroe State Forest. In R.K. Swithart, M.R. Saunders, R.A. Kalb, G.S. Haulton, & C.H. Michler (Eds.), *The Hardwood Ecosystem Experiment: a framework for studying responses to forest management*. Gen. Tech. Rep. NRS-P-108.

- Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station: 254-286.
- Schaaf, K. A., Ross-Davis, A. L., & Broussard, S. R. (2006). Exploring the dimensionality and social bases of the public's timber harvesting attitudes. *Landscape and Urban Planning*, 78(1), 135-146.
- Seto, K. C., Fragkias, M., Güneralp, B., & Reilly, M. K. (2011). A meta-analysis of global urban land expansion. *PLOS ONE*, 6(8): e23777.
- Seto, K. C., Güneralp, B., & Hutyra, L. R. (2012). Global forecasts of urban expansion to 2030 and direct impacts on biodiversity and carbon pools. *Proceedings of the National Academy of Sciences*, 109(40), 16083-16088.
- Shore, D. (1997). The Chicago Wilderness and its Critics: Controversy Erupts Over Restoration in Chicago Area. *Restoration & Management Notes*, 15(1), 25-31.
- Sommer, R. (2003). Trees and human identity. In S. Clayton & S. Opatow (Eds.), *Identity and the natural environment: The psychological significance of nature* (pp. 179-204). Cambridge, MA: MIT Press.
- Sparks, P., & Shepherd, R. (1992). Self-identity and the theory of planned behavior: Assessing the role of identification with "green consumerism". *Social Psychology Quarterly*, 55(4), 388-399.
- Stedman, R. C. (2002). Toward a social psychology of place predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behavior*, 34(5), 561-581.
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, 29(3), 309-317.

- Stern, P. C. (2000). New environmental theories: toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56*(3), 407-424.
- Stets, J. E., & Biga, C. F. (2003). Bringing identity theory into environmental sociology. *Sociological Theory, 21*(4), 398-423.
- Story, P. A., & Forsyth, D. R. (2008). Watershed conservation and preservation: Environmental engagement as helping behavior. *Journal of Environmental Psychology, 28*(4), 305-317.
- Stryker, S. (1980). *Symbolic interactionism: A social structural version*. San Francisco, CA: Benjamin-Cummings Publishing Company.
- Taylor, J. G., & Daniel, T. C. (1984). Prescribed fire: Public education and perception. *Journal of Forestry, 82*(6), 361-365.
- Temple, S. A. (1990). The nasty necessity: eradicating exotics. *Conservation Biology, 4*(2), 113-115.
- Tidball, K. G., & Krasny, M. E. (2007). From risk to resilience: What role for community greening and civic ecology in cities. In *Social learning towards a more sustainable world* (pp. 149-164). Netherlands: Wageningen Academic Publishers.
- U.S. Census Bureau (2012). Growth in Urban Population Outpaces Rest of Nation, Census Bureau Reports.
- U.S. Census Bureau (2015). Quickfacts, Census Bureau. Retrieved from <https://www.census.gov/quickfacts/fact/table/guilderlandtownalbanycitynewyork,schenectadycitynewyork,colonietownalbanycitynewyork,albanycitynewyork/PST040216>.
- United States Congress. (2008). *No Child Left Inside Act of 2008: report together with minority and additional views (to accompany H.R. 3036) (including cost estimate of the*

Congressional Budget Office). [Washington, D.C.: U.S. G.P.O. Retrieved from
<http://purl.access.gpo.gov/GPO/LPS97914>

CHAPTER 3: TOPOPHILIA VS. BIOPHILIA: AN INVESTIGATION OF THE ROLE OF PLACE PREFERENCE AND VISITOR TYPOLOGIES ON PLACE ATTACHMENT AND PLACE-PROTECTIVE BEHAVIORS

ABSTRACT

With the expansion of built environments from urbanization, there is a need to maintain and protect green spaces within urban environments. Exposure to the natural environment is imperative for human well-being as it provides mental and physical benefits to humans. However, there is limited understanding of how individuals feel in different types of natural landscapes. This study seeks to augment the limited body of literature and understanding around the public's attitudes and engagement with early successional habitats by exploring how landscape preferences and uses of an early successional habitat influence visitors' affective response to the preserve, the strength of their attachment to it, and intention to perform place-protective behaviors for an early successional habitat (i.e. The Albany Pine Bush Preserve). I found that most respondents did not have a preference for early successional or late-successional landscapes, but when they did, they preferred late-successional landscapes both for their aesthetic appeal and recreational use. My findings suggest that people's landscape preferences do not significantly predict their intention to perform place-protective behaviors. Instead, I found that behavioral intention is predicted by topophilic responses (i.e. place attachment) to the habitat, and a general biophilic response (i.e. environmental identity) to protect natural areas.

INTRODUCTION

As the human population continues to rise, expanding urban areas in the United States and around the world pose a threat to the existence of natural habitats, green spaces, and other natural areas (Brandon, Redford, & Sanderson, 1998; Seto, Fragkias, Güneralp, & Reilly, 2011; Seto, Güneralp, & Hutyrá, 2012). While Beatley (2011) argues that nature has adapted in small ways to urban environments and has been resilient in the face of various human pressures, human protection of natural areas is also imperative to ensure that natural areas continue to exist within urban environments. The existence of green spaces in urban settings are critical for human health and well-being (Beatley, 2009; 2011; Pretty, 2004). Not only do people experience health benefits from exposure to natural spaces, but they also depend on and develop meanings and attachments to the biophysical and social elements of the natural space itself, a phenomenon also referred to as topophilia ('love of place') (Low & Altman, 1992; Cresswell, 2004; Stedman & Ingalls, 2014; Tuan, 1977).

According to the biophilia hypothesis, humans have an innate desire to interact with nature and other living things (Wilson, 1984). Preferences for the natural environment generally can lead individuals to hold a nature identity, where they have an appreciation of natural spaces (Clayton, 2003; Kahn, 1999). In contrast, people may hold preferences for different types of natural spaces because of the physical characteristics of the space and their ability to perform desired activities within the space (Scannell & Gifford, 2010; Stokols & Shumaker, 1981). Both individuals' general appreciation and specific attachments to natural spaces (i.e. place attachment) have been found to significantly influence their intention to perform pro-environmental behaviors (Clayton, 2003; Halpenny, 2010; Stedman, 2002; Stets & Biga, 2003; Vaske & Kobrin, 2001).

Though research has explored a variety of different factors that may influence people's intention to perform place-protective behaviors, there have been calls to explore how individuals' preference for and attachment to different types of natural spaces influence their intention to perform pro-environmental behaviors (Halpenny, 2010; Ramkissoon, Weiler, & Smith, 2012). A substantial amount of research has explored the difference in preferences for the built environment in comparison to the natural environment, but limited research has explored how people's preferences for different natural landscapes influence their behaviors (Kaplan & Kaplan, 1989; Ulrich, 1993). Studies of individuals' responses to actively managed areas suggests that individuals prefer densely forested landscapes over more open landscapes (Gobster, 2001; Ribe, 1990). This aesthetic preference has implications for people's affective response, use, attachment, and intention to protect natural areas that utilize active management techniques (Enck & Odato, 2008; Taylor & Daniel, 1984).

As an actively managed habitat, early successional habitats are particularly interesting because the management of these spaces aims to transform densely forested landscapes to open landscapes with less-dense tree cover (Lorimer, 2001). According to hypotheses from previous research, early successional habitats are predicted to be less preferable than their late-successional counterparts (Gobster, 2001). While some research has investigated public attitudes towards landscapes after the use of active management practices (Ribe, 1990; Rogers, Hoover, & Allred, 201; Taylor & Daniel, 1984; Vodak, et al. 1985), there is little understanding of how these preferences influence the public's emotional response, use, and attachment to an early successional habitat. Further, it is unclear how individuals' landscape preferences influence the public's intention to perform behaviors to protect actively managed areas.

The current study aims to apply a place framework to explore 1) how place aesthetic and recreational preferences influence people's affective response, attachment, and intention to perform place-protective behaviors for an early- successional habitat, 2) how differences in use of an early successional habitat influence individuals' attachment to it and their intention to perform place-protective behaviors, and 3) identify what factors influence visitors' intention to perform place-protective behaviors. I will use the Albany Pine Bush Preserve, an actively managed early successional habitat located in an urban environment, as a case study.

Below, I review literature on early successional habitats, topophilia (i.e. sense of place), biophilia, and place-protective behaviors, then describe my methods and report findings. I subsequently discuss whether people's landscape preferences influence their intention to perform place-protective behaviors, how different uses of a preserve influence individuals' level of attachment to that place and their subsequent intention to perform place-protective behaviors. I end by discussing the influence of topophilia, biophilia, and other factors on place-protective behavioral intention.

LITERATURE REVIEW

Early Successional Habitats

Early successional habitats are areas predominantly composed of shrubs, grasses, and young trees (Lorimer, 2001). These areas maintain a high proportion of shrubs and grasses due to repeated disturbances (i.e. fires) that promote soil fertility, allow seed dispersal and germination, and mitigate competition (Askins, 2001; Lorimer, 2001). Due to their historical natural disturbance (e.g. lightning), early successional habitats now rely on the use of human interventions in the form of active management practices such as prescribed burns to recreate habitat disturbances that

naturally occur less often to maintain ecosystem health. This is important as many species are reliant upon early successional habitats (e.g. *American Woodcock*, prairie warbler, and cottontail rabbit) (Fuller & DeStefano, 2003; Fuller & Tur, 2012; Lorimer & White, 2003). However, the proportion of early successional forests in the Northeastern United States is on the decline and requires public support for their protection (Allg, et al., 1990; Trani, et. al., 2001). Thus, it is important to understand how people engage with early successional habitats, and whether the public is willing to perform place-protective behaviors for these areas.

Previous research has focused on individuals' affective responses to early successional habitats in comparison to late-successional forests. One of the first articles, and perhaps most cited, investigating the human dimensions of early successional habitats (Gobster, 2001) did not directly study individuals' reactions to these habitats, but applied findings from recreation and management literature to hypothesize how the public felt about and used early successional habitats in the Eastern United States. Since then, only Enck & Odato's (2008) work has empirically explored how people affectively respond to early successional habitats. The lack of understanding of human reactions to and interactions with early successional habitats provides an opportunity to investigate the factors that predict individuals' intention to perform place-protective behaviors for an early successional habitat.

Topophilia and Place: A Conceptual Framework

While the concept of biophilia investigates desire to interact with natural spaces generally, this study aims to understand the public's experiences within early successional habitats. Thus, I utilize topophilia and sense of place as a framework to understand how physical characteristics of an early successional landscape influence individuals' affective response, and uses of space. Topophilia was first defined as "...a human being's affective ties with the material environment"

(Tuan, 1974, p. 93). The concept aims to understand how people feel within a physical space, their subsequent attachments to that space, and how people create a place that has personal meaning to them. According to Tuan (1974) “topophilia may takes many forms that varies greatly in emotional range and intensity”. Therefore, attachment to a place occurs on a spectrum. They may have positive or negative emotional responses towards spaces of varying strength. While individuals can hold attachments to various places, Tuan’s initial discussion of topophilia and attachment focused on a person’s home as a reference (Tuan, 1974). He suggests that an individual’s ancestry, and familiarity with the space that individuals call home may influence their landscape preferences and perceptions of ideal places (Tuan, 1974).

Extrapolating from the home, Tuan expanded upon his own work to think about how people experience different spaces and how spaces turn into places of importance (1977). Further examination of place as a function of time suggests that individuals’ experience with a space not only is dependent on the length in time they interact with the physical characteristics of the space, but also the quality of the experiences with the space (Tuan, 1977). Further, individuals’ attachments to a space may result from social interactions they have within the space, a person’s life stage and their cultural background (Tuan, 1977). Significant social interactions with family, friends, or others within a space may lead to stronger attachments to the space. Tuan suggests that the significance of historic physical and social interactions with a space may be stronger with older individuals who seek to reflect on their past experiences and relationships, while younger people have fewer memories and experiences to reflect on (Tuan, 1977).

Since Tuan’s initial discussion of topophilia in 1974 and subsequent exploration of time, space, and place in 1977, researchers have developed and applied place theory to investigate how individuals’ interactions and relations to a space influence people’s identity and behaviors. Place

has been found to significantly predict individuals' intention to perform pro-environmental behaviors in a variety of contexts including coastal landscape changes (Devine-Wright & Howes, 2010), national parks (Halpenny, 2010), lake watersheds (Stedman, 2002), and community green spaces (Vaske & Kobrin, 2001). According to place theory, a place is a space that is given meaning (Low & Altman, 1992; Cresswell, 2004; Tuan, 1977). There are three main aspects of place: location, locale, and sense of place (Cresswell, 2004; Gieryn, 2000; Tuan; 1977). While location and locale refer to the physical qualities of place, sense of place investigates the internal cognitions that people have attached to a space.

Sense of place is comprised of: place satisfaction, place attachment, and symbolic meanings (Stedman, 2002). Place attachment refers to the emotional, behavioral, and cognitive bond that is created to the physical environment (Low & Altman, 1992). This bond can be either to the physical characteristics or to the social connections that occur within the space (Scannell & Gifford, 2010). Place attachment has three subdimensions: place affect, place dependence, and place identity which have been the focus of investigation for many studies that I review in sections below (Bricker & Kerstetter, 2000; Halpenny, 2010; Jorgensen & Stedman, 2001; Schreyer, Jacob, & White, 1981; Vaske & Kobrin, 2001). Symbolic meanings, what a place means to a person, reflects significant associations an individual has with the physical or social elements of a space. For this study, I will focus on how place affect, place dependence, and symbolic meanings can be used to understand the public's interactions with and intention to protect early successional habitats.

Affective Response and Aesthetic Preferences

Place affect reflects individuals' emotional response to the characteristics of a place (Low & Altman, 1992; Halpenny, 2010). Positive emotions towards a place are often studied to

determine an individual's attachment to the place. However, a study of 25-35-year-old New York residents' attachment to place and found that 72% of the individuals interviewed had some negative experience or emotion towards a place that was significant to them (Manzo, 2005). Regardless of an individual's positive or negative experience within a space, the place itself could still be meaningful to the individual and influence their behaviors.

According to the biophilia and active management literature, physical elements of landscapes can elicit various affective responses that lead to differences in aesthetic preference, uses, and behaviors (Kaplan, 1987). While research has found that people have positive affective responses and preferences for natural landscapes (Kaplan & Kaplan, 1989), further investigation into preferences between natural landscapes have found that areas with higher tree density, mature trees, and no indications of tree harvests elicited higher evaluations of scenic beauty among respondents (Ribe, 1990). Based upon these findings, Gobster (2001) argued that people will prefer late-successional landscapes that have a higher density of trees. In contrast, Kaplan (1989) found that open landscapes with some trees, like savannas, are preferred by the public due to the historic need for humans to seek cover while maintaining visibility in the habitat. Thus, illustrating conflicting evidence around individuals' preferences for open landscapes like early successional habitats.

However, the use of active management also can influence people's evaluation of and preference for landscapes. Analyses of landscapes with characteristics of human intervention (e.g. landscaping) reduced individuals' preference for the landscape (Kaplan, 1989). In addition, explorations of people's preferences for actively managed landscapes has found that evidence of tree harvests led to lower evaluations of the landscape's scenic beauty (Ribe, 1990). Therefore,

evidence of the use of active management practices may lead to lower aesthetic preferences for early successional habitats.

As a result of Gobster's initial hypotheses about early successional habitats, Enck & Odatto (2008) quantitatively investigated individuals' affective beliefs towards an early successional habitat. Their study found that while the public generally held positive beliefs towards the early successional habitat, people elicited more positive affective responses towards the late-successional forest (Enck & Odatto, 2008). Without visual examples of each landscape, individuals were asked to compare 16 different word-pairs. While respondents held positive affective responses for both landscapes, individuals' perceptions of the late-successional landscape were significantly more positive for 15 of the 16 items than those for the early successional habitat. This suggests that early successional habitats are not as preferable as late-successional habitats, but may still elicit a biophilic response from people. In terms of place attachment theory, whether individuals have positive or negative emotions towards a place (i.e. place affect), does not directly influence their intention to perform place-protective behaviors. Rather, place affect is strongly tied to individuals' place dependence and place identity (Halpenny, 2010). Therefore, differences in affective response to a place may influence the way people interact with the place and their subsequent dependence on an early successional habitat, but does not appear to directly influence behavioral intention.

Place Dependence and Recreational Preferences

Place dependence is rooted in the idea that the assessment of a place and a person's bond to it are influenced by their ability to perform desired activities within a space (Stokols & Shumaker, 1981). Within urban settings, people use urban parks in five main ways: 1) recreation, 2) health, 3) education, 4) volunteer or work, and 5) social (Bedimo-Rung, Mowen, & Cohen,

2005). Everyone may have different expectations for the functional use of the park, and therefore will ascribe different personal meanings to the park. However, place meanings can also become a part of an individual's personal identity through a process referred to as the role-person merger (Callero, 1985; Turner, 1978). For example, an individual who uses a nature preserve to hike, may consider themselves to be a hiker after engaging in the use of that natural space over a length of time (Moore & Graefe, 1994). This hiker identity is not limited to the specific preserve or place, but becomes integrated into the person's general perceptions of themselves and may be activated in other green spaces or areas (Callero, 1985; Stryker, 1980; Turner, 1978) and can influence their intention to perform pro-environmental behaviors (Clayton, 2003; Larson, Stedman, Cooper, & Decker, 2015).

While there continues to be a lack of understanding around how people use and depend on early successional habitats, Gobster (2001) provided hypotheses about individuals' recreational engagement with managed habitats. Gobster (2001) suggests that recreationists may use early successional landscapes for trail recreation (i.e. running, biking, etc.) or wildlife recreation (i.e. birding, nature photography, etc.). However, the arguments are based upon recreation literature exploring aspects of landscapes that appeal to various recreationists, not on direct exploration of human interactions and experiences. Gobster (2001) posits that trail-users may use early successional habitats because they prefer heterogenous landscapes which may include early successional habitats. Alternatively, the wildlife recreationists may enjoy early successional habitats because of high levels of species diversity within the habitat (Gobster, 2001).

However, the use of active management practices can inhibit an individual's ability to perform their desired activities. The inability to use the natural space for desired activities can influence individuals' value of the early successional habitat, their place attachment, and intention

to protect the place (Gobster, 1997). Like previous studies about scenic beauty, researchers utilized visual landscape comparisons to evaluate individuals' intention to visit an area after it was exposed to various levels of management that altered the landscape. Rogers, Hoover, & Allred (2013) found that tree density influenced not only people's acceptance of the management practice used, but also their likelihood to visit the area. They found that if management practices left several mature trees in the landscape, individuals were more accepting of the practice and more likely to visit than if the landscape was left with no trees whatsoever. Thus, illustrating that the extent of the landscape change that results from the use of active management practices may influence people's perceptions and use of the actively managed space.

In addition to tree removal, research has investigated individuals' intention to recreate after prescribed burns. Taylor & Daniel (1984) examined the likelihood of individuals' use of a natural space after light fires as compared to severe fires. The study revealed that there was a decrease in recreational activities and uses after both light and severe fires (Taylor & Daniel, 1984). Yet, two years after the presence of a light burn, people's intention to hike, picnic, and study nature returned to original intention levels. This suggests that active management may not have a long-term impact on recreational use of an early successional habitat.

Place Meanings

Finally, the way individuals use the space and their subsequent attachments can influence the meanings associated with a place (Stokols & Shumaker, 1981). According to the place literature, symbolic meanings (i.e. place meanings) can be individualistic, where no overlap occurs between individuals' definitions of the place because they each have unique experiences (Meinig, 1979, Relph, 1976). As a result, the number of meanings is equal to the number of people that are

interacting in the place. Alternatively, there are common meanings that are shared due to the same experiences (Greider & Garkovich, 1994).

Place meanings and place attachment are often used together to understand individuals' perceptions and behaviors around natural spaces (Stedman, 2002; 2003; Wynveen, et al., 2011). Studies conducted by Stedman (2002; 2003) predicting the behavior of Wisconsin property-owners based upon their sense of place around local lakes, found that place meanings mediated the relationship between the physical characteristics of the environment (i.e. the lakes, amount of wildlife, and number of houses on the shore) and individuals' attachment to those physical characteristics. This relationship has also been explored in the context of a U.S. national park. Wynveen, et al. (2011) also found that place meanings may influence the level of place attachment a visitor has for the place. For example, they found that visitors with high levels of place attachment more frequently identified comfort and relaxation as a reason for why the park was their favorite. Because little is known about individuals' perceptions and interactions with early successional habitats, exploring the types of place meanings people associate with an early successional habitat can help clarify what physical or social elements may influence the public's appreciation or dislike of early successional landscapes.

Place-protective Behavior

Investigating topophilia and individuals' attachment to place can be insightful as research has found that place attachment leads to stronger intentions to protect a place especially if the place is threatened or in need of restoration (Finger, 1994; Forsyth, et al., 2004; Stedman, 2002). In the environmental behavior literature, behaviors aimed at protecting a place, or place-protective behaviors (Stedman, 2002), are a subset of general pro-environmental behaviors (Larson, et al., 2015). Pro-environmental behaviors encompass several different activities from activism to

consumer behaviors. However, place-protective behaviors are behaviors “that maintain or enhance valued attributes of the setting” (Stedman, 2002, p. 561). In the context of environmental spaces, these behaviors have been described as aiming to “...restore nature in the places [people] care about” (Stedman & Ingalls, 2014, p.140). They may include stewardship behaviors (e.g. planting trees), civic behaviors (e.g. visiting the landscape and volunteering) or political behaviors (e.g. signing petitions, donating money, writing letters of support to government officials) (Larson, et al., 2015; Monroe, 2003; Stern, 2000; Winther, Volk, & Hungerford, 1984).

Place-protective behaviors have been explored in a variety of contexts from protecting local lakes (Stedman, 2002), to opposing the development of windfarms (Devine-Wright, 2009) and protecting a national park (Halpenny, 2010). These behaviors often emerge with the existence of place disruptions, elements that change one’s place identity or threaten their place meaning (Devine-Wright, 2009). Studies have found that people who are attached to a national park may perform behaviors that ensure it remain protected from elements that may place it at risk such as development from urbanization, insufficient funding, or government policies (Halpenny, 2010; Lai & Kreuter, 2012). Further, individuals’ attachment to a place can also influence their sense of personal responsibility to protect the place (Buta, Holland, & Bustam, 2013). However, both perceived risk and personal responsibility have been found to independently influence individuals’ intentions to perform behaviors to protect the at-risk objects (Brewer, Weingstein, Cuite, & Herrington, 2004; Milne, Sheerna, & Orbell, 2000; Rogers, 1975; Story & Forsyth, 2008).

Not only may people protect natural areas because of their responsibility for or attachment to a particular place, but they also could act based upon their general appreciation of green spaces. This appreciation can stem from human’s innate desire to interact with nature (i.e. biophilia), and over time this appreciation of nature can be integrated into an individuals’ self-identity or

perception of themselves. Therefore, people's intention to perform behaviors to protect an early successional habitat may be influenced by their desire to protect local green spaces. In an urban environment, people may act upon an environmental identity to protect natural spaces within a highly developed built environment. This may be the case especially if they perceive the green spaces to be threatened (Tidball & Krasny, 2007; Krasny & Tidball, 2012). However, studies of biophilia have found that even poor or mediocre natural settings are significantly more preferred than the built environment (Kaplan, Kaplan, & Wendt, 1972). Therefore, individuals may perform place-protective behaviors regardless of their aesthetic or recreational preferences for the early successional landscape.

RATIONALE

From the place literature, there has been a call to investigate individuals' attachments to different types of natural spaces (Halpenny, 2010; Ramkissoon, Weiler, & Smith, 2012). While place attachment has been explored in other natural landscapes, to my knowledge no research has investigated early successional habitats, an actively managed habitat where the landscape goes through cyclical transformations. The literature suggests that there is limited understanding into the public's relationship with early successional habitats and actively managed nature preserves generally. Thus, applying a place framework to early successional habitats invites a deeper exploration into individuals' affective responses to these habitats, level of place dependence, the array of place meanings associated with early successional habitats, and their intention to perform place-protective behaviors. This study focuses on people who have visited an early successional habitat and seeks to understand how people use early successional habitats, their attitudinal preferences for an early successional landscape over a late-successional landscape, their

attachments to an early successional habitat, and their intention to perform place-protective behaviors. I sought to explore the following research questions:

1. How do differences between individuals' preferences to view or recreate in a late-successional landscape vs. an early successional landscape relate to their affective response, level of place attachment, and intention to perform place-protective behaviors for an early successional nature preserve?
2. How does the way in which individuals use an early successional habitat affect their place meanings, place attachment and their intention to perform place-protective behaviors?
3. What is the role of place, aesthetic and recreational preferences for early successional landscapes, visitor type, environmental identity, personal responsibility, and perceived risk in predicting visitors' intention to perform place-protective behaviors?

METHODS

Study Site: The Albany Pine Bush Preserve

My study site is the Albany Pine Bush Preserve (APBP), an early successional habitat near New York's capital city of Albany. Covering an area of about 3,200 acres, the Albany Pine Bush is one of the world's largest inland pine barren ecosystems, and in 2014 was designated as a National Natural Landmark by the U.S. Department of the Interior (Barnes, 2003). An inland pine barren is an early successional habitat similar to a prairie, grassland, or savanna. Pine barrens like

the Albany Pine Bush Preserve are established upon sand dunes and have been historically exposed to frequent surface burns from lightning and humans (Barnes, 2003; Curtis, 1959; Lorimer & White, 2003). Like other early successional habitats, these fires have allowed the growth of vegetation by improving the soil quality, promoting the dispersal and germination of native plants, and helping to stave off succession (Askins, 2001; Barnes, 2003). Additionally, the Albany Pine Bush Preserve is the home to a wide array of species that are reliant on grasses, shrubs, and small trees. There are at least 20 species that are reliant upon the habitat and are either listed as endangered or at-risk of becoming endangered (e.g. the Karner Blue Butterfly, Buck Moth, and the Spotted Turtle) (Barnes, 2003). To maintain species diversity and ecosystem health, the Albany Pine Bush Preserve requires active management techniques, such as the use of tree cutting, prescribed fires, and invasive species removal. Thus, areas of the preserve are frequently changing from highly forested to open landscapes.

In addition to its focus on habitat management and species preservation, the Albany Pine Bush Preserve also provides opportunities for the public to interact with the ecosystem through recreation and education programming. The preserve borders an urban interface including the cities of Albany (pop. 97,856) and Schenectady (pop. 66,135) and the towns of Guilderland (pop. 35,303) and Colonie (pop 81,591) (U.S. Census, 2010). Because the preserve is fragmented, there are many residential and commercial buildings that border or are within the perimeter of the preserve, and in some cases, businesses are surrounded by preserve land. This makes the preserve easily accessible to the surrounding public. The preserve currently has over 18 miles of recreational trails and allows limited hunting on some portions of its land. In 2007, the preserve added a Discovery Center with interactive exhibits, programs, and education materials for the public. The

Discovery Center and its programming are one of the main resources to educate visitors about the preserve's unique habitat, species, and active management.

Procedure

To understand differences in visitor engagement with and attachment to an early successional habitat, I identified visitors from a sample of residents living within 10 miles of the Albany Pine Bush Preserve. Residents were contacted using a mail survey. To ensure that I had a large enough sample for the statistical analyses, I oversampled preserve visitors using a sample of individuals who had attended a program or checked in at the Discovery Center between 2013 and 2016. Individuals from the oversample were contacted via email and invited to complete a web survey on Qualtrics.

Upon receiving IRB approval (Protocol # 1008001625), residents were surveyed through a four-stage mailing of a paper survey. Individuals were selected from a stratified random sample of residential property owners within 10-miles of the Albany Pine Bush Preserve from the 2015 New York GIS Clearinghouse Database (Office of Real Property). Individuals were stratified by county (Albany, Schenectady, Saratoga, and Rensselaer). A random sample for each county was drawn proportional to their population size within the 10-mile radius of the Albany Pine Bush Preserve. A total of 1,200 individuals were selected for the mail survey. These individuals received four personally-addressed mailings (survey and cover letter, reminder/thank you post-cards, replacement survey and cover letter, and third cover letter) every week starting September 28, 2016. The final mailing was sent on November 3, 2016 (*See Appendix A*). Mail respondents who had not visited the Albany Pine Bush Preserve were removed from the sample.

To augment the response rate, individuals living in municipalities adjacent to the Albany Pine Bush Preserve (i.e. Albany, Colonie, Guilderland, Niskayuna, and Schenectady) who had not responded by November 10, 2016 were identified for a drop-off mail back distribution effort. A total of 188 houses were identified for the drop-off mail back distribution. A team of two individuals drove to houses from 9am until 5pm from November 12-13, 2016. One individual, identified as a Cornell University representative, approached the house with a clear handled bag containing a copy of the mail survey and a brightly colored cover letter (*Appendix A*). I knocked or rang the doorbell twice waiting for an individual to answer the door. If someone answered, I explained the survey and left them with instructions for returning the survey. However, if there was no answer, a copy of the survey was left hanging on their door. I then recorded whether 1) the survey was left on the door (i.e. delivered), 2) I spoke to the resident (interaction), or 3) if the survey was undeliverable (i.e. lack of access due to security or wrong address). A total of 172 houses were visited.

For the visitor oversample, the Albany Pine Bush Preserve provided me with a list of visitors who had either checked into the preserve's education center or attended a preserve-led program in the last three years (2013-2016). The list had a total of 4,609 individuals which was used as the sampling frame for the web survey. Individuals living out of state or without valid email addresses were removed from the sampling frame. A list of preserve visitors living in municipalities within 10 miles of the preserve (n= 3,835) were separated from those who lived more than 10 miles away from the preserve (n=515). A random sample of visitors living within 10-miles of the preserve (n = 1,400) and all the visitors living more than 10 miles from the preserve (n=515) were contacted via email through a Qualtrics web survey. Individuals from the visitor oversample were sent the same cover letters as the mail participants and were contacted four times

with the initial letter and survey invitation sent on October 6, 2016. The final email reminder was sent on November 16, 2016 (*Appendix A*). Preserve visitors were given the same survey as mail participants, but were also asked the municipality in which they currently lived.

Finally, to create a single dataset for analyses, I combined the mail survey visitor and web survey visitor samples. To account for non-response bias, short (5 minute) non-response telephone surveys were conducted with non-respondents to both the web (n=50) and mail (n= 50) surveys from December 5-13, 2016. The survey included a subset of the socio-demographic, visit, and behavior questions from the original survey (*Appendix F*).

Measures

Preference for early successional or late-successional landscapes

Items were taken from Taylor & Daniel's (1984) investigation into the public's evaluations of natural areas after light and severe fires. Individuals evaluated two unlabeled images based on their recreational acceptability and scenic beauty. Image A was a late-successional landscape with a trail and Image B was an early successional landscape also including a trail (See *Appendix G*). Using a Likert 5-point scale, individuals indicated how much they agreed or disagreed with each statement. Categorical differences between individuals' responses were used to categorize them into three groups: "Prefer early successional landscapes", "Equally prefer", and "Prefer late-successional landscapes".

Aesthetic

Individuals' responses to the item "I find this space appealing to look at" were compared from Image A (late-successional) to Image B (early successional). Individuals who indicated stronger agreement with Image B than Image A were

categorized as “Prefer early successional landscapes”. Those who reported stronger agreement with Image A than Image B were “Prefer late-successional landscapes”. Finally, individuals who indicated the same level of agreement were classified as “Equally Prefer”.

Recreation

The same technique was used to identify differences between individuals’ desire to use the space for recreation. Individuals responded how strongly they agreed or disagreed with the following statement, “I am very likely to use this space for recreation” for both Images A and B. Their responses were compared and categorized into “Prefer early successional landscape”, “Equally prefer”, and “Prefer late-successional landscape”.

Place Meaning

Individuals’ place meaning was measured using a single item asking respondents, “What do you value most about the Albany Pine Bush Preserve?”. The eight response categories were created from previous interviews with residents, users, and staff members. They included, “Trails”, “Discovery Center”, “Wildlife”, “Ecosystem”, “Programs”, “Proximity”, “Aesthetic/Views”, and “Other”. Individuals who responded to the “Other” category were provided the opportunity to write in their own answer.

Summative scales were constructed with survey items for other variables using principal component analysis. Because the scales I used were developed from previously tested scales, items were grouped based upon theoretical merit to reduce the number of items analyzed in the exploratory principal component analysis. Theory-based item groups with 5 or more items were analyzed using exploratory principal component analysis to assess whether they measured multiple

or single constructs. Scales were developed based upon their factor loading and reliability values. Full scales can be found in the tables in *Appendix G*.

Affective Response

A semantic differential scale measuring visitors' affective response when visiting the Albany Pine Bush Preserve was created using three items from Enck & Odato's (2003) 16 word pairs. Respondents utilized a 1-5 scale to indicate which word reflected how they felt while visiting the APBP. The items included were: Tense-Relaxed, Sad-Happy, and Agitated-Calm. A scale analysis found the affect scale to be reliable ($\alpha = 0.870$).

Place Attachment

An eight-item place attachment scale was created using items from Halpenny (2010). Three items reflected place dependence, (i.e. "The Albany Pine Bush Preserve is the best place for what I like to do", "I get more satisfaction out of visiting the Albany Pine Bush Preserve than most other natural areas", and "I wouldn't substitute any other area for doing the types of things I do at the Albany Pine Bush Preserve."). Three items reflected place identity (e.g. Visiting the Albany Pine Bush Preserve says a lot about who I am", "I feel I can really be myself in the Albany Pine Bush Preserve", and "The Albany Pine Bush Preserve means a great deal to me"), and two items reflected place affect. (e.g. "I am fond of the Albany Pine Bush Preserve" and "I feel strong, positive feelings for the Albany Pine Bush Preserve"). A full list of the items can be found in *Appendix G*. All the items loaded onto a single factor with a Cronbach Alpha of 0.891.

Place-protective behavioral intention

I developed a scale of place-protective behaviors based on items used in Halpenny (2010) and from semi-structured interviews with staff, residents, and visitors. Using a 5-point Likert Scale, respondents were asked how much they agreed with the statement, “In the next 12 months, I intend to...”. Respondents then reported their agreement with six different behaviors. The six-item scale was comprised of three political behaviors (i.e. write letters of support, donate money, volunteer) and three civic behaviors (i.e. visit the preserve, attend preserve program, and talk positively about the preserve). The behavioral intention scale was reliable ($\alpha = 0.872$).

Environmental identity

An environmental identity scale was constructed using five items from Clayton (2003) and two items related to species values from Kotchen & Reiling (2000). The following seven items were included: “I spend a lot of my time in natural settings (woods, ocean, mountains, lake, desert)”, “I think of myself as a part of nature not separate from it”, “Engaging in environmental behaviors is important to me”, “If I had enough time and money, I would definitely devote some of it to environmental causes”, “I would feel that an important part of my life would be missing if I was not able to get out and enjoy nature from time to time”, The species values questions included were “Plants and animals have as much right as humans to exist”, “I value the existence of endangered species”. Together the environmental identity scale had a Cronbach’s alpha reliability score of 0.852.

Personal responsibility

To assess an individual’s sense of personal responsibility to support the Albany Pine Bush Preserve individuals were asked to the extent in which they agreed or disagreed with two items “I feel a personal responsibility to support management practices that promote habitat

at the Albany Pine Bush preserve” and “I feel a personal responsibility to support the Albany Pine Bush Preserve”. The scale had a Cronbach’s alpha reliability of 0.872.

Perceived risk:

A six-item perceived risk scale was created to identify participants’ perceptions of the severity of various risks to the preserve. Using a 5-point scale from “None” to “Very High”, respondents assessed how much risk each of the following items pose to the Albany Pine Bush Preserve: residential development, commercial development, lack of financial support, lack of use/visitors, non-sanctioned use of the preserve, and extinction of rare plants and animals in the preserve. These items were compiled from interviews with residents, visitors, and APBP staff members to create the perceived risk scale ($\alpha = 0.816$).

Socio-demographic variables

Distance from Preserve

Because mailing addresses were not available for web survey respondents, I categorized an individual’s distance from the preserve based upon the municipality in which they reside (city, town, hamlet, or village). Using QGIS, I created a 5-mile and 10-mile buffer around the Albany Pine Bush Preserve. With U.S. Census data, I identified the municipalities that uniquely fell within 5 miles, between 5-10 miles, or <10 miles of the preserve. Based upon their reported municipality of residence, individuals were coded “0” if they lived within 5 miles of the preserve, “1” if they lived between 5 and 10 miles, and “2” if they lived more than 10 miles of the preserve.

Gender

Individuals were asked “What is your gender?” and given the options “Male”, “Female”, and “Other”. Individuals were coded “0” for male, “1” for female, and “2” for other. Due to the low response of “Other” (n=1), individuals indicating “Other” were excluded from the analysis.

Age

Participants reported the year in which they were born. To transform the variable so that it reflected an increase in age, we subtracted participants’ birthyear from 2016, the year the survey was implemented. Individuals who were under the age of 18 were removed from the sample.

Education

I measured participants’ level of education by asking them to select the highest level of education they completed out of a six-point scale. Individuals were given the following options: “Less than high school diploma” (1), “High school diploma” (2), “Some college” (3), “2-year college degree” (4), “4-year college degree” (5), and “Graduate/ Professional degree” (6).

Data Analysis

I performed t-tests and chi-square analyses on socio-demographic variables to see if there were significant statistical differences that would prevent me from combining the sample of visitors from the mail survey and the sample of visitors from the web survey. In addition, respondents were compared to non-respondents across socio-demographic, visitor, and place-protective behavioral intention variables. Means and standard deviations were assessed with t-tests for continuous variables and chi-square tests were performed on categorical variables. No

significant differences were found between the respondents and non-respondents for either the mail or web survey (*Appendix F*).

To explore the ways in which preference for early successional and late-successional landscapes influenced visitors' affective response, attachment, and intention to perform place-protective behaviors for the Albany Pine Bush Preserve, I ran t-test analyses to identify significant differences between each landscape preference type (i.e. aesthetic and recreational). First, I investigated how individuals' aesthetic landscape preferences differed across items of the semantic differential scale to compare to findings from Enck & Odatto (2008). A similar analysis was done comparing differences in affective response across individuals' recreational landscape preferences. Finally, I conducted a series of t-tests to investigate whether there were significant differences between respondents' overall affective response to the APBP, their attachment to the preserve, and their intention to perform place-protective behaviors across different landscape preferences.

I utilized a two-step cluster analysis to classify visitors into three clusters based upon 1) the number of times they had visited the preserve in the last 12 months and 2) what types of activities they performed when visiting the Albany Pine Bush Preserve. (i.e. It is where I recreate, learn, relax, socialize, or other). I compared the clusters based upon socio-demographic variables to develop typologies and describe each unique cluster. Clusters were compared across their level of attachment to the APBP and intention to support the Albany Pine Bush Preserve. Chi square tests were conducted across the three variables. Subsequent post-hoc comparisons were also done using chi-square analyses for individual cluster comparisons and to reduce the incidence of Type 1 Errors, a Sidak Correction was applied.

Finally, to investigate the predictive power of factors on place-protective behavioral intention, I ran a multiple linear regression model with place attachment, aesthetic landscape preference, recreational landscape preference, environmental identity, visitor type, and perceived risk as my independent variables. I also included distance, age, gender, and education as socio-demographic variables in the regression model. Prior to running the regression analysis, I checked the assumptions of the linear model. I confirmed that the residuals were normally distributed, and that there were no outliers. I also checked for multi-collinearity and heteroscedasticity in the model. Some variable transformations were necessary and are described below. A correlation matrix of all the independent variables can be found in *Appendix H*.

RESULTS

I received 188 (23.8%) mail surveys and 293 (19.9%) visitors completed the Qualtrics web survey for an overall response rate of 21.85%. Of the completed mail surveys, 165 were received from the four-step mailing process, and 24 were received following the drop-off mail-back process. A total of 95 mail survey respondents who had not visited the Albany Pine Bush Preserve were removed from analysis. Since there were no significant socio-demographic differences between the two samples, the web and mail visitor samples were combined into a single 386 respondent dataset.

Data Transformations

Aesthetic and Recreation Landscape Preference

Due to a small proportion of respondents reporting a preference for the early successional landscape for both its aesthetic appeal (n=13) and recreational use (n=20), I

sought to combine these responses with individuals who equally preferred both landscapes for both the aesthetic (n=223) and recreation (n=246) items. The two groups were compared across socio-demographic and key question areas prior to combination. I did not find significant differences between the groups; therefore, the two groups were combined into a single group for both aesthetic preferences¹ (n=236) and recreational preferences² (n=266). Respondents who held an equal preference were coded “0” and those who preferred late-successional landscapes were coded “1”.

Perceived Risk and Personal Responsibility

I analyzed plots of all variables and found that the perceived risk and personal responsibility variables were negatively skewed indicating that many respondents had high ratings of risk and personal responsibility. Due to their distribution, perceived risk and personal responsibility were transformed into dichotomous variables. Responses less than four were coded as “low” and responses greater than or equal to four were coded as “high” for both variables. The two variables were dummy coded “0” for low and “1” for high.

Respondent Characteristics

Survey respondents were primarily White (93.9%) and on average were 52 years old (SD =14.2). They were highly educated with 75% of them attaining a 4-year college degree or higher. Thirty-eight percent of respondents had a household income of \$100,000 or greater. Sixty-two percent of the respondents were female and 71% of all respondents had children. About half (54.6%) of the responding individuals lived within five miles of the Albany Pine Bush Preserve,

¹ Equal Aesthetic Preference includes 13 respondents who preferred the early-successional landscape

² Equal Recreational Preference includes 20 respondents who preferred the early-successional landscape

25% lived between 5 and 10 miles of the preserve, and 20% lived further than 10 miles from the preserve. Descriptive statistics of all variables can be found in *Table 3.1*.

Table 3.1: Means and percentages for dependent and independent variables and demographics (Bolded items are reference categories)

Variable	Mean (SD) and Percentages
Place-protective behavioral intention ¹	3.27 ± 0.82
Place attachment ¹	3.69 ± 0.65
Affective response ²	4.20 ± 0.97
Aesthetic landscape preference ¹	
Equal preference^a	61.6%
Prefer late-successional	38.4%
Recreational landscape preference ¹	
Equal preference^a	69.8%
Prefer late-successional	30.2%
Environmental identity ¹	4.39 ± 0.56
Personal responsibility ¹	
Low (0-3.99)	31.0%
High (4-5)	69.0%
Visitor type	
Neutral Neighbors	23.0%
Engaged Supporters	48.9%
Educated Learners	28.0%
Perceived risk ³	
Low (0-3.99)	34.1%
High (4-5)	65.9%
Distance from preserve	
<5 miles	54.6%
5-10 miles	25.3%
>10 miles	20.1%
Gender	
Male	36.8%
Female	62.9%
Age (years)	52.37 ± 14.20
Education ⁴	5.04 ± 1.17

¹Response Categories 1= Strongly Disagree 2=Disagree, 3= Neutral, 4=Agree, 5 =Strongly Agree

²Response Categories Negative 1,2,3,4,5 Positive (e.g. Sad 1,2,3,4,5 Happy)

^a Equal Preference includes respondents who preferred the early successional landscape

³Response Categories 1=None, 2=Low, 3= Medium, 4= High, 5= Very High

⁴Response Categories 1 = Less than high school diploma, 2 = High school diploma, 3= Some college, 4= 2-year college degree, 5 = 4-year college degree, 6 = Graduate/ Professional degree

Preference for Early Successional or Late-Successional Landscapes

For my first research question, I investigated comparisons between individuals' aesthetic and recreational preferences for either an early successional landscape or a late-successional landscape. Overall, I found that 62% of respondents found both landscapes equally appealing. In addition, 70% of individuals would equally use either landscape for recreation in comparison to the 30% of individuals that preferred late-successional landscapes. On average, respondents who preferred late-successional landscapes did not indicate that the early successional landscape was aesthetically unappealing nor that they would not use the early successional landscape for recreation (*Table 3.2a* and *Table 3.2b*). Instead respondents who preferred late-successional habitats reported that they felt neutral about the aesthetic appeal of the early successional habitat and their likelihood of using it.

Table 3.2a: Means and standard deviations for how appealing individuals in each preference group found the early successional and late-successional landscape images

"I find this space appealing to look at"	Aesthetic Appeal	
	Equal preference ¹	Prefer late-successional landscape (<i>n</i> =147)
Early successional landscape (Image B)	4.61 ± 0.65	3.54 ± 0.67
Late-successional landscape (Image A)	4.51 ± 0.86	4.82 ± 0.40

¹ Equal Aesthetic Preference includes 13 individuals who preferred the early successional landscape

Table 3.2b: Mean and standard deviations for how likely individuals in each preference group were to recreate in the early successional landscape and late-successional landscapes

“I am very likely to use this space for recreation”	Recreational Use	
	Equal preference ² (<i>n</i> =266)	Prefer late-successional landscape (<i>n</i> =115)
Early successional landscape (Image B)	4.29 ± 0.84	3.22 ± 0.84
Late-successional landscape (Image A)	4.19 ± 0.91	4.57 ± 0.62

² Equal Recreational Preference includes 20 individuals who preferred the early successional landscape

To determine how individuals’ affective responses to the APBP differed by aesthetic and recreational landscape preferences, I ran t-tests comparing the means of each preference group (*Table 3.3*). I found that respondents who equally preferred the aesthetic appeal¹ of both landscapes had significantly more positive affective responses to the APBP than those who preferred the aesthetic appeal of the late-successional landscape. Similarly, individuals who preferred late-successional forests for recreation felt significantly less happy and calm at the Albany Pine Bush Preserve than those who held an equal recreational preference for both landscapes.

Finally, I explored how respondents’ overall affective response, place attachment, and intention to perform place-protective behaviors differed across aesthetic and recreational landscape preferences (*Table 3.4*). Visitors generally had positive affective responses towards the APBP and overall indicated a medium level of place attachment. Across all landscape preference groups, respondents reported a neutral level of intention to perform place-protective behaviors in support of the Albany Pine Bush Preserve. Further, there were no significant differences in intention to perform place-protective behaviors within the aesthetic preference or recreational preference groups (*Table 3.4*). However, individuals who held equal landscape preferences for

aesthetic appeal¹ and recreation² indicated significantly higher affective responses and levels of attachment to the Albany Pine Bush Preserve than those who preferred late-successional landscapes (*Table 3.4*).

Table 3.3: Means and t-test results for affective responses to the Albany Pine Bush Preserve by visitors' aesthetic or recreational preferences for early successional or late-successional landscapes

Affective Response	Aesthetic Appeal			Recreational Use		
	Equal preference ¹ (n=236)	Prefer late-successional landscape (n=147)	p-value	Equal preference ² (n=266)	Prefer late-successional landscape (n=115)	p-value
Tense-Relaxed	4.45± 0.78	4.03± 1.19	<0.001	4.34± 0.94	4.14± 1.05	0.08
Sad-Happy	4.35± 0.92	3.86± 1.31	<0.001	4.23± 1.05	3.96± 1.23	0.05
Agitated-Calm	4.35± 0.97	3.84± 1.35	<0.001	4.25± 1.08	3.90± 1.30	0.02

¹ Equal Aesthetic Preference includes 13 individuals who preferred the early successional landscape

¹ Equal Recreational Preference includes 20 individuals who preferred the early successional landscape

Table 3.4: Means and t-test results for overall affective response to the Albany Pine Bush Preserve, place attachment, and intention to perform place-protective behaviors by visitors' aesthetic or recreational preferences for early successional or late-successional landscapes

Scale	Aesthetic Appeal			Recreational Use		
	Equal preference ¹ (n=236)	Prefer late-successional landscape (n=147)	p-value	Equal preference ² (n=266)	Prefer late-successional landscape (n=115)	p-value
Overall affective response to APBP	4.38± 0.79	3.92± 1.15	<0.001	4.27± 0.93	4.01± 1.04	0.03
Place attachment	3.79± 0.59	3.54± 0.71	<0.001	3.75± 0.66	3.55± 0.61	0.003
Place-protective behavioral intention	3.33± 0.80	3.16± 0.83	0.06	3.31± 0.85	3.19± 0.72	0.18

¹ Equal Aesthetic Preference includes 13 individuals who preferred the early successional landscape

² Equal Recreational Preference includes 20 individuals who preferred the early successional landscape

Visitor Typologies and Place

To explore my second set of research questions, I investigated differences between the place meanings, place attachment, and intention to perform place-protective behaviors across three visitor types. I found that individuals used the preserve in a variety of ways including but not limited to hiking (88%), attending educational programs (60%), socializing with family and friends (22%), meditating and relaxing (43%), animal watching (52%), and recreating (53%). The cluster analysis produced three distinct visitor typologies: 1) Neutral Neighbors, 2) Educated Learners, and 3) Engaged Supporters. Neutral Neighbors were individuals who were long-term residents of the area, but generally did not visit the preserve. The second group, Educated Learners, predominantly came to attend educational programs and learn. These individuals would visit infrequently, but were willing to travel over 10 miles to attend programs. Finally, the Engaged Supporters relied on the preserve for a variety of activities which included recreating, learning, socializing, and relaxing at the Albany Pine Bush Preserve. Engaged Supporters visited the preserve the most frequently and predominantly lived within 5 miles of the preserve.

With respect to place meaning, I found that all three visitor typologies highly valued the ecosystem, trails, and wildlife (*Figure 3.1*). Upon examination of differences in place meaning there were only two significant differences across the visitor typologies. First, I found that Engaged Supporters placed significantly higher value on programming than did Educated Learners ($p < 0.001$). Second, Neutral Neighbors placed significantly higher value on the proximity of the preserve than did Educated Learners ($p < 0.05$).

The three visitor typologies were also compared across place attachment and intention to perform place-protective behaviors (*Table 3.5*). Engaged Supporters had a significantly higher level of place attachment than either Educated Learners or Neutral Neighbors. In relation to

differences in intention to perform place-protective behaviors, Engaged Supporters also had significantly higher intention than the Educated Learners or the Neutral Neighbors. However, Educated Learners had significantly higher intentions to perform place-protective behaviors than Neutral Neighbors (Table 3.5).

Figure 3.1: Place meanings by visitor type

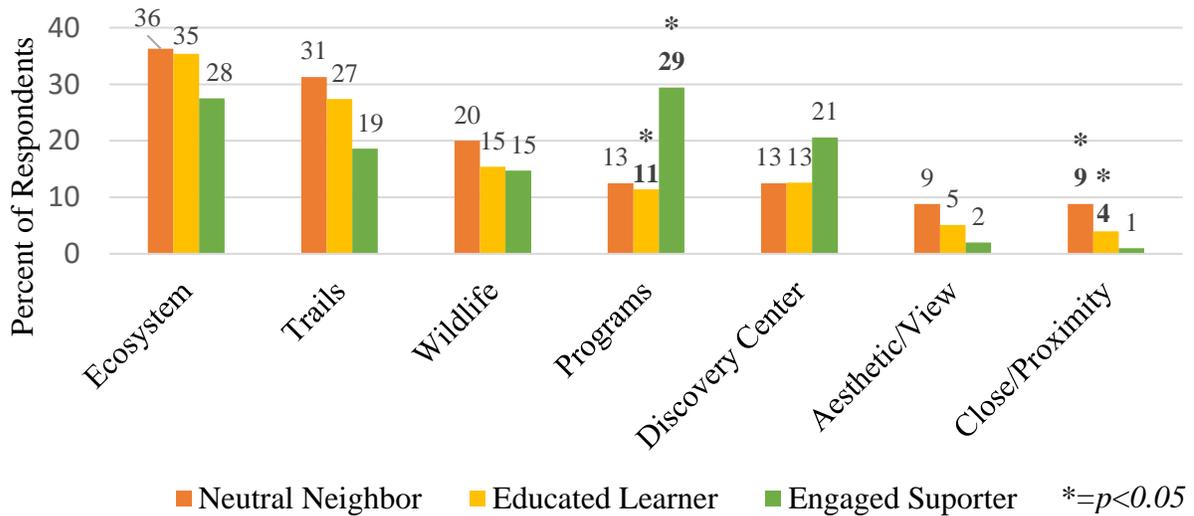


Table 3.5: Means and t-test results for level of place attachment and intention to perform place-protective behaviors by visitor type

Characteristic	Neutral Neighbors (n=87) Mean (SD)	Engaged Supporters (n=185) Mean (SD)	Educated Learners (n=106) Mean (SD)	p-value for ANOVA
Place attachment ¹	3.36 ± 0.69 ^b	3.97 ± 0.57 ^{ac}	3.53 ± 0.53 ^b	<0.001
Place-protective behavioral intention ¹	2.73 ± 0.84 ^{bc}	3.55 ± 0.74 ^{ac}	3.26 ± 0.64 ^{ab}	<0.001

¹Response Categories 1= Strongly Disagree 2=Disagree, 3= Neutral, 4=Agree, 5 =Strongly Agree

^a significant difference from Neutral Neighbors at $p < 0.05$

^b significant difference from Engaged Supporter at $p < 0.05$

^c significant difference from Educated Learners at $p < 0.05$

Predictors of Intention to Perform Place-protective Behaviors

The final research question explored the predictive power of place attachment, landscape preferences, environmental identity, personal responsibility, visitor typologies and perceived risk on individuals' intentions to perform place-protective support behaviors (*Table 3.6*). The multiple linear regression model accounted for 46% of the variation in behavioral intention (Adjusted $R^2=0.46$, VIF=1.93). I found that as individuals had stronger levels of place attachment ($\beta=0.60$, $p < 0.001$) their intention to perform place-protective behavior significantly increased. In addition, individuals with stronger environmental identities ($\beta=0.18$, $p < 0.05$) indicated higher intention to perform place-protective behaviors.

Visitors who reported a high sense of personal responsibility ($\beta=0.29$, $p < 0.01$) for the Albany Pine Bush Preserve had significantly higher place-protective behavioral intention than those who reported a low sense of responsibility. Further, being an Educated Learner more strongly predicted individuals' intention to perform place-protective behaviors than did being a Neutral Neighbor ($\beta=0.41$, $p < 0.001$). Similarly, I found that being an Engaged Supporter more strongly predicted individuals' behavioral intention than did being a Neutral Neighbor ($\beta=0.25$, $p < 0.05$). Finally, individuals' landscape preferences for recreation or aesthetics and visitors' perceptions of risk were not predictive of place-protective behavior, nor were any of the socio-demographic variables.

Table 3.6: Multiple linear regression model for place-protective behavioral intention

	Coefficient	SE	p-value
Intercept	-0.03	0.45	0.953
Place attachment	0.60	0.07	<0.001***
Preference aesthetic	-0.02	0.09	0.783
Preference recreation	-0.04	0.09	0.708
Environmental identity	0.18	0.09	0.034*
Personal responsibility	0.29	0.10	0.007**
Visitor type: Engaged Supporters ¹	0.25	0.10	0.013*
Visitor type: Educated Learners ¹	0.41	0.11	<0.001***
Perceived risk	-0.04	0.08	0.652
Distance from preserve <5 miles	0.12	0.09	0.163
Distance from preserve >10 miles	-0.084	0.11	0.291
Age	-0.003	0.003	0.202
Gender	-0.08	0.08	0.310
Education	0.02	0.03	0.639

R²=0.482 Adjusted R²=0.456 df= 253 F-Statistic=18.12 VIF=1.93

¹compared to Neutral Neighbors as the reference category

*= $p < 0.05$, **= $p < 0.01$, ***= $p < 0.001$

DISCUSSION

Preference for Early Successional or Late-Successional Landscapes

I found that most respondents held an equal preference for early successional and late-successional landscapes for both their aesthetic appeal and intention to use recreationally. However, when individuals held landscape preferences, they were more likely to prefer late-successional habitats than early successional landscapes for recreation and their aesthetic appeal. Thus, my findings partially support Gobster's (2001) hypothesis that individuals will prefer late-successional habitats to early successional ones.

In addition, there were significant differences in affective response to the APBP based on whether individuals held no landscape preference or preferred the late-successional habitat. This revealed that individuals who equally appreciated both landscapes, elicited more positive

affective responses to the Albany Pine Bush Preserve, an early successional habitat. However, overall visitors held positive affective responses to the habitat. Indicating that while early successional habitats are unique ecosystems and provide habitat for a variety of different species, individuals' affective response, and attachment to these landscapes may be rooted in biophilia or their general appreciation of nature and greens spaces (Stedman & Ingalls, 2014).

Visitor Typologies: How Individuals Use and Relate to Early Successional Habitats

With regards to the visitor typologies, differences in visitors' use of the preserve was significant in predicting behavioral intention. Moreover, visitors who relied on the preserve for a variety of activities (i.e. relaxation, socialization, recreation, and learning) also visited the most frequently, indicating that they had a strong dependence on the place. These Engaged Supporters had significantly stronger levels of place attachment and intention to perform place-protective behaviors than individuals who did not visit as frequently or only visited for one type of activity.

Reflecting upon Gobster's (2001) hypotheses about trail and wildlife recreationists use of an early successional habitat, I found that visitors did, in fact, use the early successional habitat for wildlife recreation and exercise recreation. In addition, all three visitor types reported a high value of wildlife, trails and the ecosystem. This too supports Gobster's (2001) hypotheses that individuals would recreationally use early successional habitats due to their abundance of wildlife. However, it is unclear whether the heterogenous landscape of the early successional habitats is what draws individuals to engage in exercise recreation (i.e. running, biking, etc.).

While individuals used the preserve in many ways, my assessment of place meaning suggests that visitors had shared experiences depending on the types of activities they engaged with at the Albany Pine Bush Preserve and their frequency of visitation. This suggests that

individuals held shared place meanings in accordance with Greider & Garkovich (1994) and that the place meanings were even shared across different visitor typologies.

Predicting Place-protective Behaviors for Early Successional Habitats

Finally, the results of the regression analysis found that neither aesthetic nor recreational landscape preferences were predictive of place-protective behavioral intention. Instead, visitors' self-identification with an environmental identity and high sense of personal responsibility were predictive of their intention to perform place-protective behaviors. In line with the biophilia literature, my findings support the idea that individuals living in urban environments may indicate strong affective responses and attachments to green spaces relative to the surrounding built urban environment (Ulrich, 1993). Not only did individuals generally value the early successional habitat as a green space, but there were also specific physical and social aspects of the habitat that individuals attached to and which influenced their place-protective behavioral intention. Generally, the model supports the influence of both biophilia and topophilia on individuals' intention to perform place-protective behaviors, providing support for Stedman & Ingalls' (2011) expansion of the topophilia framework to include and integrate biophilia into future analyses of place and pro-environmental behaviors. Further, it suggests that biophilia may not only influence greening behaviors, but also other types of place-protective behaviors such as the civic and political place-protective behaviors that were explored within this study.

It was surprising that individuals' assessment of perceived risk was also not significant as threats to green spaces have been found to influence place-protective behaviors (Finger, 1994; Forsyth, et al., 2004; Stedman, 2002). In addition, I did not expect visitor typologies to be significant predictors of behavioral intention independent of biophilic and topophilic factors. Visitors' use and dependence on a place should have been reflected in their level of place

attachment (Halpenny, 2010); however, the Educated Learners and Engaged Supporters not only interacted with the preserve for recreation and its natural elements, but also visited and used the Discovery Center, an additional educational structure within the preserve. Thus, the significance of these variables may also suggest that coming to the preserve for learning significantly predicted individuals' intention to perform place-protective behaviors. Finally, I found that none of the socio-demographic variables were significant predictors of place-protective behavioral intention. Perhaps this was because other variables such as visitor typology accounted for the variance of distance, age, gender, and education.

Limitations and Future Research

My findings show that visitors' intention to perform place-protective behaviors is influenced by both their biophilic responses to the natural space and attachments to specific characteristics of the early successional habitat. However, this study did not explore the mechanisms that influence place attachments or biophilic responses to early successional habitats. Further comparisons of individuals' evaluations of built landscapes, early successional, and late-successional landscapes could further explore the influence of biophilia on individuals' valuations of early successional habitats and their subsequent intention to perform place-protective behaviors. Moreover, my findings indicate that a deeper exploration into the interaction between biophilia and topophilia on place-protective behaviors should be explored.

CONCLUSION

This study explored the predictive power of biophilia and topophilia on visitors' intention to perform place-protective behaviors and found that biophilia and topophilia may be complimentary concepts that are important to understanding individuals' interactions with and

intention to support an urban nature preserve. Thus, providing quantitative support for utilizing a framework that incorporates both biophilia and topophilia when exploring place-protective behaviors in urban environments (Stedman & Ingalls, 2011). Similar to Tuan's initial discussion of place, I found that the level of engagement a visitor had with the preserve influenced their level of attachment to it. Thus, encouraging visitors to use the space in a variety of ways and for different activities may lead to stronger place attachments. This is important as the strength of visitors' attachment to the place can predict their intention to perform place-protective behaviors. Therefore, land managers and educators seeking to garner support for an actively managed urban nature preserve may want to appeal to visitors' attachment to specific physical or social characteristics of the area (topophilia). In addition, framing messaging around visitors' appreciation and desire to protect green spaces (biophilia) may also help promote visitors' intention to perform place-protective behaviors for these areas. Finally, messaging may want to activate individuals sense of responsibility for the natural area or preserve as high sense of personal responsibility also is predictive of place-protective behavioral intention.

REFERENCES

- Allg, R. J., Hohenstein, W. G., Murray, B. C., & Haight, R. G. (1990). Changes in area of timberland in the United States, 1952-2040, by ownership, forest type, region, and state. *Gen. Tech. Rep. SE-64. Asheville, NC: US Department of Agriculture, Forest Service, Southeastern Forest Experiment Station. 34 p., 64.*
- Askins, R. A. 2001. Sustaining biological diversity in early successional communities: the challenge of managing unpopular habitats. *Wildlife Society Bulletin* 20: 407-412.
- Barnes, J. K. (2003). *Natural history of the Albany Pine Bush*. Albany, NY: New York State Museum.
- Beatley, T. (2009). Biophilic urbanism: Inviting nature back to our communities and into our lives. *William & Mary Environmental Law and Policy Review*, 34(1), 209.
- Beatley, T. (2011). *Biophilic cities: integrating nature into urban design and planning*. Washington, DC: Island Press.
- Bedimo-Rung, A. L., Mowen, A. J., & Cohen, D. A. (2005). The significance of parks to physical activity and public health: a conceptual model. *American Journal of Preventive Medicine*, 28(2), 159-168.
- Brandon, K., Redford, K. H., & Sanderson, S. (Eds.). (1998). *Parks in peril: people, politics, and protected areas*. Washington, DC: Island Press.
- Brewer, N. T., Weinstein, N. D., Cuite, C. L., & Herrington, J. E. (2004). Risk perceptions and their relation to risk behavior. *Annals of Behavioral Medicine*, 27(2), 125-130.
- Bricker, K. S., & Kerstetter, D. L. (2000). Level of specialization and place attachment: An exploratory study of whitewater recreationists. *Leisure Sciences*, 22(4), 233-257.

- Buta, N., Holland, S. M., & Bustam, T. D. (2013). Residents' interactions with and attachments to Retezat National Park, Romania: implications for environmental responsibility. *World Leisure Journal*, 55(2), 151-166.
- Callero, P. L. (1985). Role-identity salience. *Social Psychology Quarterly*, 203-215.
- Clayton, S. D. (2003). Environmental Identity: A conceptual and an operational definition. In S. Clayton & S. Opatow (Eds.), *Identity and the natural environment: The psychological significance of nature* (pp. 45-66). Cambridge, MA: MIT Press.
- Cresswell, T. (2014). *Place: an introduction*. West Sussex, UK: John Wiley & Sons Ltd.
- Curtis, J. T. (1959). *The vegetation of Wisconsin: An ordination of plant communities*. Madison, WI: University of Wisconsin Press.
- Devine-Wright, P. (2009). Rethinking NIMBYism: The role of place attachment and place identity in explaining place-protective action. *Journal of Community & Applied Social Psychology*, 19(6), 426-441.
- Enck, J., & Odato, M. (2008). Public attitudes and affective beliefs about early-and late-successional stages of the Great Northern Forest. *Journal of Forestry*, 106(7), 388-395.
- Finger, M. (1994). From knowledge to action? Exploring the relationships between environmental experiences, learning, and behavior. *Journal of Social Issues*, 50(3), 141-160.
- Forsyth, D. R., Garcia, M., Zyzniewski, L. E., Story, P. A., & Kerr, N. A. (2004). Watershed pollution and preservation: The awareness-appraisal model of environmentally positive intentions and behaviors. *Analyses of Social Issues and Public Policy*, 4(1), 115-128.

- Fuller, T. K., & DeStefano, S. (2003). Relative importance of early successional forests and shrubland habitats to mammals in the northeastern United States. *Forest Ecology and Management, 185*(1), 75-79.
- Gieryn, T. F. (2000). A space for place in sociology. *Annual Review of Sociology, 26*(1), 463-496.
- Gobster, P. H. (2001). Visions of nature: conflict and compatibility in urban park restoration. *Landscape and Urban Planning, 56*(1), 35-51.
- Greider, T., & Garkovich, L. (1994). Landscapes: The social construction of nature and the environment. *Rural Sociology, 59*(1), 1-24.
- Halpenny, E. A. (2010). Pro-environmental behaviours and park visitors: The effect of place attachment. *Journal of Environmental Psychology, 30*(4), 409-421.
- Jorgensen, B. S., & Stedman, R. C. (2006). A comparative analysis of predictors of sense of place dimensions: Attachment to, dependence on, and identification with lakeshore properties. *Journal of Environmental Management, 79*(3), 316-327.
- Kahn, P. H. (1999). *The human relationship with nature: Development and culture*. Cambridge, MA: MIT Press.
- Kaplan, S. (1987). Aesthetics, affect, and cognition: Environmental preference from an evolutionary perspective. *Environment and Behavior, 19*(1), 3-32.
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge, UK: Cambridge University Press.
- Kaplan, S., Kaplan, R., & Wendt, J. S. (1972). Rated preference and complexity for natural and urban visual material. *Attention, Perception, & Psychophysics, 12*(4), 354-356.

- Kotchen, M. J., & Reiling, S. D. (2000). Environmental attitudes, motivations, and contingent valuation of nonuse values: A case study involving endangered species. *Ecological Economics*, 32(1), 93-107.
- Krasny, M. E., & Tidball, K. G. (2012). Civic ecology: A pathway for Earth Stewardship in cities. *Frontiers in Ecology and the Environment*, 10(5), 267-273.
- Lai, P. H., & Kreuter, U. P. (2012). Examining the direct and indirect effects of environmental change and place attachment on land management decisions in the Hill Country of Texas, USA. *Landscape and Urban Planning*, 104(3), 320-328.
- Larson, L. R., Stedman, R. C., Cooper, C. B., & Decker, D. J. (2015). Understanding the multi-dimensional structure of pro-environmental behavior. *Journal of Environmental Psychology*, 43, 112-124.
- Lorimer, C. G. (2001). Historical and ecological roles of disturbance in eastern North American forests: 9,000 years of change. *Wildlife Society Bulletin*, 29(2), 425-439.
- Lorimer, C. G., & White, A. S. (2003). Scale and frequency of natural disturbances in the northeastern US: implications for early successional forest habitats and regional age distributions. *Forest Ecology and Management*, 185(1), 41-64.
- Low, S. M., & Altman, I. (1992). *Place attachment* (pp. 1-12). New York, NY: Plenum Press.
- Meinig, D. W. (1979). The beholding eye: Ten versions of the same scene. In D.W. Meinig (Ed.), *The interpretation of ordinary landscapes: Geographical essays* (pp. 33-48). New York, NY: Oxford University Press
- Milne, S., Sheeran, P., & Orbell, S. (2000). Prediction and intervention in health-related behavior: A meta-analytic review of protection motivation theory. *Journal of Applied Social Psychology*, 30(1), 106-143.

- Monroe, M. C. (2003). Two avenues for encouraging conservation behaviors. *Human Ecology Review, 10*(2), 113-125.
- Moore, R. L., & Graefe, A. R. (1994). Attachments to recreation settings: The case of rail-trail users. *Leisure sciences, 16*(1), 17-31.
- Pretty, J. (2004). How nature contributes to mental and physical health. *Spirituality and Health International, 5*(2), 68-78.
- Ramkissoon, H., Weiler, B., & Smith, L. D. G. (2012). Place attachment and pro-environmental behaviour in national parks: the development of a conceptual framework. *Journal of Sustainable Tourism, 20*(2), 257-276.
- Relph, E. (1976). *Place and placelessness* (Vol. 1). London, UK: Pion.
- Ribe, R. G. (1990). A general model for understanding the perception of scenic beauty in northern hardwood forests. *Landscape Journal, 9*(2), 86-101.
- Rogers, C. R. (1975). Empathic: An unappreciated way of being. *The Counseling Psychologist, 5*(2), 2-10.
- Rogers, S. C., Hoover, W. L., & Allred, S. B. (2013). Public acceptability of forest management practices at Morgan-Monroe State Forest. In R.K. Swithart, M.R. Saunders, R.A. Kalb, G.S. Haulton, & C.H. Michler (Eds.), *The Hardwood Ecosystem Experiment: a framework for studying responses to forest management*. Gen. Tech. Rep. NRS-P-108. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station: 254-286.
- Scannell, L., & Gifford, R. (2010a). The relations between natural and civic place attachment and pro-environmental behavior. *Journal of Environmental Psychology, 30*(3), 289-297.

- Schreyer, R., Jacobs, G. R., & White, R. G. (1981). Environmental meaning as a determinant of spatial behaviour in recreation. In J.W. Frazier & B.J. Epstein (Eds.) *Proceedings of Applied Geography Conferences, Volume 4*. (pp. 294-300). Binghamton, NY: Department of Geography, State University of New York.
- Seto, K. C., Fragkias, M., Güneralp, B., & Reilly, M. K. (2011). A meta-analysis of global urban land expansion. *PLOS ONE*, 6(8): e23777.
- Seto, K. C., Güneralp, B., & Hutyrá, L. R. (2012). Global forecasts of urban expansion to 2030 and direct impacts on biodiversity and carbon pools. *Proceedings of the National Academy of Sciences*, 109(40), 16083-16088.
- Sparks, P., & Shepherd, R. (1992). Self-identity and the theory of planned behavior: Assessing the role of identification with "green consumerism". *Social Psychology Quarterly*, 55(4), 388-399.
- Stedman, R. C. (2002). Toward a social psychology of place predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behavior*, 34(5), 561-581.
- Stedman, R. C. (2003). Is it really just a social construction?: The contribution of the physical environment to sense of place. *Society & Natural Resources*, 16(8), 671-685.
- Stedman, R. C., & Ingalls, M. (2014). Topophilia, biophilia and greening in the red zone. In K.G. Tidball & M.E. Krasny (Eds.), *Greening in the red zone: Disaster, resilience, and community greening* (pp. 129-144). New York, NY: Springer.
- Stern, P. C. (2000). New environmental theories: toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56(3), 407-424.
- Stets, J. E., & Biga, C. F. (2003). Bringing identity theory into environmental sociology. *Sociological Theory*, 21(4), 398-423.

- Stokols, D., & Shumaker, S. A. (1981). People in places: A transactional view of settings. In J.H. Harvey (Ed.) *Cognition, social behavior, and the environment* (pp. 441-488). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Story, P. A., & Forsyth, D. R. (2008). Watershed conservation and preservation: Environmental engagement as helping behavior. *Journal of Environmental Psychology*, 28(4), 305-317.
- Stryker, S. (1980). *Symbolic interactionism: A social structural version*. San Francisco, CA: Benjamin-Cummings Publishing Company.
- Taylor, J. G., & Daniel, T. C. (1984). Prescribed fire: Public education and perception. *Journal of Forestry*, 82(6), 361-365.
- Terry, D. J., Hogg, M. A., & White, K. M. (1999). The theory of planned behaviour: self-identity, social identity and group norms. *British Journal of Social Psychology*, 38(3), 225-244.
- Tidball, K. G., & Krasny, M. E. (2007). From risk to resilience: What role for community greening and civic ecology in cities. In A.E.J. Wals (Ed.) *Social learning towards a more sustainable world* (pp. 149-164). Netherlands: Wageningen Academic Publishers.
- Trani, M. K., Brooks, R. T., Schmidt, T. L., Rudis, V. A., & Gabbard, C. M. (2001). Patterns and trends of early successional forests in the eastern United States. *Wildlife Society Bulletin* 29(2), 413-424.
- Tuan, Y. F. (1974). *Topophilia: A study of environmental perceptions, attitudes, and values*. New York, NY: Columbia University Press.
- Tuan, Y. F. (1977). *Space and place: The perspective of experience*. Minneapolis, MN: University of Minnesota Press.
- Turner, R. H. (1978). The role and the person. *American Journal of Sociology*, 84(1), 1-23.

- Ulrich, R. S. (1993). Biophilia, biophobia, and natural landscapes. In S.R. Kellert & E.O. Wilson (Eds.) *The biophilia hypothesis* (pp. 73-137). Washington, DC: Island Press.
- U.S. Census Bureau (2016). Growth in Urban Population Outpaces Rest of Nation, Census Bureau Reports.
- Vaske, J. J., & Kobrin, K. C. (2001). Place attachment and environmentally responsible behavior. *The Journal of Environmental Education*, 32(4), 16-21.
- Visschers, V. H., Wickli, N., & Siegrist, M. (2016). Sorting out food waste behaviour: A survey on the motivators and barriers of self-reported amounts of food waste in households. *Journal of Environmental Psychology*, 45, 66-78.
- Vodak, M. C., Roberts, P. L., Wellman, J. D., & Buhyoff, G. J. (1985). Scenic impacts of eastern hardwood management. *Forest Science*, 31(2), 289-301.
- Wilson, E. O. (1984). *Biophilia*. Cambridge, Massachusetts: Harvard University Press.
- Winther A.A., T.L. Volk and H.R. Hungerford. (1994). Issue investigation and citizenship action training: An instructional model for environmental education. In L.V. Bradwell, M.C. Monroe, & M.T. Tudor (Eds.), *Environmental Problem Solving: Theory, Practice, and Possibilities in Environmental Education* (pp. 22-37). Troy, OH: North American Association for Environmental Education.
- Wynveen, C. J., Kyle, G. T., Absher, J. D., & Theodori, G. L. (2011). The meanings associated with varying degrees of attachment to a natural landscape. *Journal of Leisure Research*, 43(2), 290.

CHAPTER 4: CONCLUSIONS

In this chapter, I summarize the results from each study, discuss the relationships between the findings, the theoretical and practical implications of the work, and suggest directions for future research.

Summary of Key Findings

I quantitatively explored the relationship between various factors and place-protective behaviors using mail and web surveys of residents living within 10 miles of the Albany Pine Bush Preserve and visitors of the preserve. In Chapter 2, I focused my analysis on how individuals' attitudes towards management practices and awareness of the preserve's use of management practices predicted individuals' place-protective behavioral intention. I found that individuals' attitudes alone did not predict behavioral intention, but that individuals also needed to be aware of the preserve's use of active management. However, when placed in a larger predictive model with other factors (i.e. knowledge, attitudes, responsibility, perceived risk, and identity), the interaction effect between attitudes and awareness was no longer significant. Instead, individuals level of personal responsibility, environmental identity and socio-demographic variables were significant predictors of intention. Further exploration into the predictors of personal responsibility revealed that residents felt a strong sense of responsibility for the Albany Pine Bush Preserve if they had a strong environmental identity, held positive attitudes towards management practices, and held positive attitudes towards the open landscape. However, individuals' perceptions of risk were not significant in either the responsibility or behavioral intention models.

In Chapter 3, the analyses shifted towards an investigation of how an actively managed landscape may influence individuals' preferences for, attachments to, and intention to perform

place-protective behaviors for an early successional habitat. From the results, I found that individuals did not generally hold a preference for early successional or late-successional habitats, but when they did hold a preference, they had an aesthetic and recreational preference for late-successional landscapes. Further, I found that these landscape preferences did not predict individuals' intention to perform place-protective behaviors. Instead, people acted upon their environmental identities, or a general sense of biophilia, attachments to the Albany Pine Bush Preserve as a unique place, and may be influenced by the educational programs provided by the Discovery Center at the Albany Pine Bush Preserve.

Discussion of Key Findings

Across the studies, I explored the influence of various factors on place-protective behaviors within urban settings. Both studies engaged the public's reaction to a nature preserve's use of active management practices. The first study directly explored the relationship between residents' attitudes towards active management practices and place-protective behavioral intention. While the second study investigated how preferences for an actively managed landscape influenced visitors' affective response to the preserve, their attachment to the preserve, and intention to perform place-protective behaviors.

Across both studies, I found that a strong environmental identity and high sense of personal responsibility were strong predictors of place-protective behavioral intention. In alignment with Clayton (2003), I found that environmental identity is an independent predictor of behavioral intention. Within my third chapter, I argue that identification with an environmental identity, may be a result of biophilia, a desire to be in and interact with nature. Individuals' general appreciation of natural spaces and desire to engage with natural areas (i.e. environmental identity) was a strong predictor of visitors' place-protective behavioral intention. However, individuals'

preferences for early successional (i.e. open) landscapes or late-successional (i.e. densely forested) landscapes were not predictive of behavioral intention. Though it is unclear whether this phenomenon is universal, it is understandable why individuals living in urban environments may rely on a biophilic response to influence their behaviors. Research has indicated that individuals prefer natural environments to the built environments (Kaplan, 1987). In urban areas, there often is a large concentration of built elements in the environment (e.g. buildings and roads) and limited natural landscapes or elements (i.e. trees and wildlife). Therefore, people may hold a general affective response for any natural landscape regardless if they find it aesthetically appealing. Further, my findings suggest that individuals' attitudes towards active management practices and awareness of a preserve's use of these practices may not influence their behavior. Thus, the use of active management practices in an urban setting may not significantly influence individuals' intention as long as it does not threaten the existence of the natural space.

Although individuals' behavior was influenced by biophilic responses, visitors still interacted with and attached to the physical and social elements of the preserve. Individuals' topophilic responses, illustrated by visitors' level of place attachment (the bond to the physical or social elements of a place) also significantly predicted their intention to perform place-protective behaviors. This supports a body of literature suggesting that place attachment is a strong predictor of pro-environmental and place-protective behavioral intention (Halpenny, 2010; Stedman, 2002; Vaske & Kobrin, 2001). One of the most surprising findings was that visitor typologies predicted behavioral intention independent of individuals' level of place attachment or general feelings of biophilia. However, visitors often engaged with the Albany Pine Bush's Discovery Center for educational programming which may also influence individuals' intention to perform place-protective behaviors.

Despite the theoretical support for the predictive power of perceived risk on place-protective behavioral intention especially in threatened places (Finger, 1994; Forsyth, et al, 2004; Stedman, 2002), perceived risk did not predict behavioral intention in either study, nor was it predictive of personal responsibility. This was particularly interesting as individuals indicated relatively high perceptions of risk to the Albany Pine Bush Preserve. Thus, suggesting that other factors such as biophilia and topophilia had a stronger influence on individuals' behavioral intention than perceived risk.

With respect to socio-demographic variables, I found that distance from the preserve, age, and gender were significant predictors of place-protective behavioral intention for residents living within 10 miles of the preserve. Individuals who lived closer to the preserve (<5 miles) had significantly higher intentions, as did younger individuals and females. However, none of these socio-demographic variables were predictive of people's sense of personal responsibility nor visitor intention to perform place-protective behaviors. For distance, this suggests that individuals living within urban environments did not illustrate a diffusion of responsibility (Latané & Darley, 1975). However, it is still unclear why distance significantly influences residents, but not visitors of the preserve. Perhaps, visitors desire to attend educational programs was a stronger motivator than the distance to the preserve.

Overall, this work had four main theoretical implications. The first is the importance of measuring environmental identity and sense of personal responsibility in understanding place-protective behavioral intention. Although there is limited application of both the environmental identity and personal responsibility constructs within the pro-environmental behavior literature, my findings reflect a strong relationship between identity, responsibility, and place protective behavior. Second, is my finding that both topophilia and biophilia predict place-protective

behavioral intention. This provides quantitative support for Stedman & Ingalls (2011) expansion of the toponophilia framework to include biophilia, and suggests that biophilia and toponophilia may be complimentary concepts that are important for understanding place-protective behaviors. Third, Fishbein & Ajzen's (1977; 2010) behavioral intention framework is commonly referenced and used within the pro-environmental behavioral intention literature. However, attitudes, a key factor in the model, was not predictive of place-protective behavioral intention in either study. Thus, signifying that people's attitudes may not have as strong of an influence as identity and personal responsibility on their intention to perform behaviors to protect areas that they care about. Finally, both studies investigated the Albany Pine Bush Preserve, an actively managed early-successional habitat. The work within this thesis contributes to the limited understanding of the public's response and interaction with early successional landscapes and their intention to protect actively managed landscapes in the future.

Limitations and Future Research

While there were limitations to the generalization of my research, the studies herein do contribute to the understanding of how the public reacts to the use of active management practices in urban nature preserves. This thesis suggests that urban individuals' biophilic response may influence their intention to perform place-protective behaviors for natural. Therefore, future research should explore how biophilia influences urban place-protective behaviors, and whether individuals' preferences for natural landscapes over built landscapes drives their intention to perform place-protective behaviors. Further, my research suggests that additional exploration into the relationship between toponophilia and biophilia (Stedman & Ingalls, 2011) is needed especially with respect to place-protective behaviors.

In relation to the influence of active management practices, my studies focused on supportive behaviors that aimed to protect the nature preserve. Individuals' attitudes towards management practices and the public's awareness of the preserve's use of management practices may have a stronger influence on residents' intention to perform opposition behaviors such as protesting, calling the preserve, or writing letters to the preserve. Predicting opposition behaviors of actively managed nature preserves is also a relatively understudied area. Therefore, future exploration of the factors that predict opposition may be extremely beneficial to help land managers better understand what types of individuals are the most likely to oppose the use of management practices and how managers can use outreach and education techniques to reduce public opposition towards the use of active management.

Finally, while both studies explored the predictive power of perceived risk on place-protective behavioral intention, it was not found to be a significant predictor in either study. The lack of relationship may result from a lack of variability within the scale for both studies. Only high-risk items identified by interviewees were included on the scale which resulted in a large proportion of respondents reporting high perceptions of risk. Future investigations of individuals' perceptions of risk should ensure that the perceived risk scale allows for more variability by including both high and low risk items. Perhaps a scale with more variability may improve measurement and change the predictive power of the variable on place-protective behavioral intention.

Conclusion: Practical Applications

This thesis examined how the use of active management practices influenced individuals' affective responses, attachments to, and intention to perform place-protective behaviors. The findings can be particularly helpful for land managers of actively managed natural areas in helping

them understand how the public responds to actively managed habitats, and how the public's experiences influence their intention to perform place-protective behaviors in support of an actively managed urban natural area. From my examination of visitors, I suggest that land managers and environmental educators encourage multiple uses and interactions with the natural space. Greater public dependence on the space can improve community engagement around the actively managed space and may lead to stronger attachments to the space and subsequent behaviors to protect the place. To promote community engagement and garner civic or community support for an actively managed space, managers and educators can use outreach and education materials that appeal to individuals' sense of personal responsibility for the space. Activation of individuals' environmental identity by framing materials around people's general appreciation and desire to be in natural spaces may help in appealing to individuals' sense of personal responsibility and increase the public's intention to perform place-protective behaviors in support of an actively managed urban nature preserve.

REFERENCES

- Clayton, S. D. (2003). Environmental Identity: A conceptual and an operational definition. In S. Clayton & S. Opatow (Eds.), *Identity and the natural environment: The psychological significance of nature* (pp. 45-66). Cambridge, MA: MIT Press.
- Finger, M. (1994). From knowledge to action? Exploring the relationships between environmental experiences, learning, and behavior. *Journal of Social Issues, 50* (3), 141–160.
- Fishbein, M., & Ajzen, I. (1977). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York, NY: Taylor & Francis Group.
- Forsyth, D. R., Garcia, M., Zyzniewski, L. E., Story, P. A., & Kerr, N. A. (2004). Watershed pollution and preservation: The awareness–appraisal model of environmentally positive intentions and behaviors. *Analyses of Social Issues and Public Policy, 4*(1), 115-128.
- Halpenny, E. A. (2010). Pro-environmental behaviours and park visitors: The effect of place attachment. *Journal of Environmental Psychology, 30*(4), 409-421.
- Kaplan, S. (1987). Aesthetics, affect, and cognition: Environmental preference from an evolutionary perspective. *Environment and Behavior, 19*(1), 3-32.
- Latané, B., & Darley, J. M. (1970). *The unresponsive bystander: Why doesn't he help?*. New York, NY: Appleton-Century-Crofts.
- Stedman, R. C. (2002). Toward a social psychology of place predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behavior, 34*(5), 561-581.

Stedman, R. C., & Ingalls, M. (2014). Topophilia, biophilia and greening in the red zone.

In K.G. Tidball & M.E. Krasny (Eds.), *Greening in the red zone: Disaster, resilience, and community greening* (pp. 129-144). New York, NY: Springer.

Vaske, J. J., & Kobrin, K. C. (2001). Place attachment and environmentally responsible behavior. *The Journal of Environmental Education*, 32(4), 16-21.

APPENDICES

Appendix A: Survey Cover Letters for Mail, Web, and Drop-Off Surveys

A.1 Mail Survey Cover Letters

September 22, 2016

Dear Capital Region Resident:

We are sending you the enclosed questionnaire because we would like to learn about your views of nature preserves in New York's Capital District.

Cornell University is conducting this survey, funded by the Albany Pine Bush Preserve, to gain more information about how the community views and uses nature preserves in New York's Capital District. The results will be used to help improve the Albany Pine Bush Preserve's future conservation-related education, communication, and outreach.

Your name was randomly selected from New York State property records from Albany, Saratoga, Schenectady, and Rensselaer Counties. Even if you have not been to a nature preserve, it is still important for you to fill out the survey so we can learn about what types of natural areas and programs you would like to see available.

Please complete the enclosed questionnaire as soon as possible, seal it with the white resealable label provided, and drop it in any mailbox; return postage has been paid. Your participation in the survey is strictly voluntary, but your response is very important to us. Your identity will be kept confidential and the information you give us will never be associated with your name.

Thank you in advance for your help with this study.

Sincerely,



Sarah Naiman
Dean's Excellence Fellow
MS Student



Shorna B. Allred
Associate Professor and Associate Director
Human Dimensions Research Unit

September 29, 2016

Dear Capital Region Resident:

Last week we mailed you a questionnaire asking about your use and views of nature preserves. If you have already completed and returned the questionnaire, please accept our sincere thanks for your help. If you have not yet completed it, we would appreciate it if you would take a few minutes now to fill it out. We greatly appreciate your prompt response.

Regardless of whether or not you have visited a nature preserve, your answers are important to us. Postage has been provided, so just fill out the questionnaire, seal it, and drop it in the nearest mailbox.

Thanks again for your help.

Sincerely,



Sarah Naiman
Dean's Excellence Fellow
MS Student



Shorna B. Allred
Associate Professor and Associate Director
Human Dimensions Research Unit

October 13, 2016

Dear Capital Region Resident:

About three weeks ago we wrote to you seeking information about your use and views of nature preserves. If you have already completed and returned the questionnaire, please accept our sincere thanks for your help. If you have not yet done so, please take the time to complete it today.

Cornell University is working with the Albany Pine Bush Preserve, a nature preserve in the Capital District. Your participation in this survey will improve the Albany Pine Bush Preserve's future conservation-related education, communication, and outreach. For the results of the survey to be truly representative of all citizens in the Capital District, we need your response.

Let us assure you once again that your participation in this study is voluntary. Your identity will be kept confidential and the information you give us will never be associated with your name. In case our earlier mailing did not reach you, or in the event that your questionnaire has been misplaced, we have enclosed a replacement questionnaire. Return postage has been paid. After completing the questionnaire, simply seal it with the white resealable label provided, and drop it in any mailbox.

Thank you for your time and effort.

Sincerely,



Sarah Naiman
Dean's Excellence Fellow
MS Student



Shorna B. Allred
Associate Professor and Associate Director
Human Dimensions Research Unit

October 20, 2016

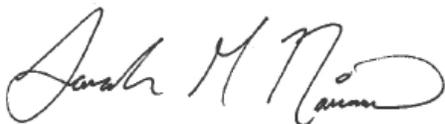
Dear Capital Region Resident:

We are writing to you one last time to encourage you to participate in the survey of residents' views and use of nature preserves in New York's Capital District. The study is collecting information on your views of existence and protection of nature preserves. Even if you have not visited a nature preserve, it is still important for you to fill out the survey so that we can understand your perspectives. Your identity will be kept confidential and the information you give us will never be associated with your name.

Although we have received a large number of completed questionnaires, we have not yet heard from you. Our past research tells us that those who do not return their questionnaires right away often have quite different experiences and opinions from those who do. For the survey results to reflect accurately all types of residents, we need to hear from you and others who have not yet responded. Simply complete the questionnaire, seal it with the white resealable label provided, and drop it in any mailbox. Return postage has been paid.

Thank you for your time and effort.

Sincerely,



Sarah Naiman
Dean's Excellence Fellow
MS Student



Shorna B. Allred
Associate Professor and Associate Director
Human Dimensions Research Unit

A.2 Web Survey Cover Letter

We are asking you to complete a questionnaire that explores your thoughts and experiences with natural areas in New York's Capital District.

The current study is being led by Cornell's Human Dimensions Research Unit in cooperation with the Albany Pine Bush Preserve.

What the study is about

We would like to know about the public's views of nature preserves in New York's Capital District. Nature preserves are natural areas that are managed to protect plants, animals, or physical features of the land. This information will be used to help improve the Albany Pine Bush Preserve's future conservation-related education, communication, and outreach.

Privacy/Confidentiality/Data Security

Your name will be replaced with an id number, and will never be stored as part of the dataset. Data will be kept secure by storing it on password protected computers and on USB devices kept in locked files. Only members of the research team will have access to the de-identified data. We anticipate that your participation in this survey presents no greater risk than everyday use of the Internet.

Taking part is voluntary

Your involvement is voluntary. You may refuse to participate before the study begins, discontinue at any time, or skip any questions/procedures that may make you feel uncomfortable, with no penalty to you, and no adverse effects on relationship with Cornell University, the researchers, or any of our affiliates.

If you have questions

If you have questions about this survey, you may contact:

Sarah Naiman
Dean's Excellence Fellow
MS Student
smn88@cornell.edu
773-787-6220

Shorna Allred Ph.D.
Associate Professor and Associate Director
Human Dimensions Research Unit
srb237@cornell.edu
607-255-2149

If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) for Human Participants at 607-255-6182 or access their website at <http://www.irb.cornell.edu>.

THANK YOU FOR YOUR HELP!

October 6, 2016

Dear Albany Pine Bush User,

Last week we emailed you a questionnaire asking about your use and views of nature preserves (e.g. Albany Pine Bush Preserve). We would appreciate it if you would take a few minutes now to fill it out. We greatly appreciate your prompt response.

Regardless of whether or not you have recently visited the Albany Pine Bush Preserve, your answers are important to us.

Follow this link to the Survey:

[\\${1://SurveyLink?d=Take the survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${1://SurveyURL}](#)

Follow the link to opt out of future emails:

[\\${1://OptOutLink?d=Click here to unsubscribe}](#)

Thanks again for your help.

Sincerely,

Sarah Naiman
Dean's Excellence Fellow
MS Student

Shorna B. Allred Ph.D.
Associate Professor and Associate Director
Human Dimensions Research Unit

October 11, 2016

Dear Albany Pine Bush User:

About two weeks ago we wrote to you seeking information about your use and views of nature preserves (e.g. Albany Pine Bush Preserve) in New York's Capital District.

Cornell University is working with the Albany Pine Bush Preserve to improve the Albany Pine Bush Preserve's communication, outreach, and education to residents and users like you. Even if you have not recently visited the Albany Pine Bush Preserve, it is still important for you to fill out the survey so that we can understand your perspectives.

Let us assure you once again that your participation in this study is voluntary. Your identity will be kept confidential and the information you give us will never be associated with your name.

Follow this link to the Survey:

[\\${1://SurveyLink?d=Take the survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${1://SurveyURL}](#)

Follow the link to opt out of future emails:

[\\${1://OptOutLink?d=Click here to unsubscribe}](#)

Thank you for your time and effort.

Sincerely,

Sarah Naiman
Dean's Excellence Fellow
MS Student

Shorna B. Allred Ph.D.
Associate Professor and Associate Director
Human Dimensions Research Unit

October 19, 2016

Dear Albany Pine Bush User,

About three weeks ago we wrote to you seeking information about your use and views of nature preserves (e.g. Albany Pine Bush Preserve).

Cornell University is working with the Albany Pine Bush Preserve. Your participation in this survey will improve the Albany Pine Bush Preserve's future conservation-related education, communication, and outreach. For the results of the survey to be truly representative of individuals who interact with the Albany Pine Bush Preserve, we need your response.

Let us assure you once again that your participation in this study is voluntary. Your identity will be kept confidential and the information you give us will never be associated with your name.

Follow this link to the Survey:

[\\${1://SurveyLink?d=Take the survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${1://SurveyURL}](#)

Follow the link to opt out of future emails:

[\\${1://OptOutLink?d=Click here to unsubscribe}](#)

Thank you for your time and effort.

Sincerely,

Sarah Naiman
Dean's Excellence Fellow
MS Student

Shorna B. Allred Ph.D.
Associate Professor and Associate Director
Human Dimensions Research Unit

November 16, 2016

Dear Albany Pine Bush User,

We are writing to you one last time to encourage you to participate in the survey of residents' views and use of nature preserves (e.g. Albany Pine Bush Preserve) in New York's Capital District.

The study is collecting information on your views of existence and protection of nature preserves. Even if you have not recently visited the Albany Pine Bush Preserve, it is still important for you to fill out the survey so that we can understand your perspectives. Your identity will be kept confidential and the information you give us will never be associated with your name.

Although we have received a large number of completed questionnaires, we have not yet heard from you. Our past research tells us that those who do not return their questionnaires right away often have quite different experiences and opinions from those who do. For the survey results to reflect accurately all types of residents, we need to hear from you and others who have not yet responded. The survey will officially close on Friday 12/9/16.

Follow this link to the Survey:

[\\${1://SurveyLink?d=Take the survey}](#)

Or copy and paste the URL below into your internet browser:

[\\${1://SurveyURL}](#)

Follow the link to opt out of future emails:

[\\${1://OptOutLink?d=Click here to unsubscribe}](#)

Thank you for your time and effort.

Sincerely,

Sarah Naiman
Dean's Excellence Fellow
MS Student

Shorna B. Allred Ph.D.
Associate Professor and Associate Director
Human Dimensions Research Unit

A.3 Drop-Off Cover Letter

Nov. 12, 2016

Dear Capitol Region Resident:

Several weeks ago we invited you to participate in a survey of residents' views and use of nature preserves. Unfortunately, we didn't hear from as many people as we had hoped, so we are making this special effort to encourage residents like you to fill, complete, and mail back our questionnaire. We want to make sure the results truly represent the views of people in the region, not just those with strong opinions who might respond first.

The survey is voluntary and your identity will be kept confidential; the information you give us will never be associated with your name.

We hope that you take the time to complete the survey. Thank you for your time and effort.

Sincerely,



Sarah Naiman
Dean's Excellence Fellow
MS Student



Shorna B. Allred, Ph.D.
Associate Professor and Associate Director
Human Dimensions Research Unit

Appendix B: Chapter 2 Non-Response Bias Analysis and Comparisons to Census Data

B.1 Non-Response Survey

1) First, could you tell me which of the following best applies to you?

- 1--I have visited the Albany Pine Bush Preserve.
- 2--I have heard of the Albany Pine Bush Preserve, but never visited it.
- 3--I have never heard of the Albany Pine Bush Preserve.

2) In what year were you born?

3) What municipality (e.g. city, town, hamlet, village) do you live in?

4) What is the highest level of school you have completed or the highest degree you have received?

- 0--Less than high school diploma
- 1--High School diploma
- 2--Some college
- 3--2-year college degree
- 4--4-year college degree
- 5--Graduate/ Professional Degree

5) Please indicate whether you agree or disagree with the following statement about the Albany Pine Bush:

It is important to protect natural areas that support rare plants and animals.

- 1--Strongly disagree
- 2--Disagree
- 3--Neutral
- 4--Agree
- 5--Strongly Agree

If never heard of READ: The Albany Pine Bush Preserve is a 3,200-acre nature preserve just north of Albany, New York with over 18 miles of trails, a variety of wildlife, and an indoor discovery center.

6) In the next 12 months, how likely are you to visit the Albany Pine Bush Preserve?

- 1--Extremely Unlikely
- 2--Unlikely
- 3--Neutral
- 4--Likely
- 5- Extremely Likely

7) We are interested in improving our response rate for future studies, could you please tell me a little about why you did not complete the email survey?

Record Gender: 0 Male 1 Female 2 Unknown

Chi-Square and T-test Analyses were conducted for survey respondents and non-respondents who lived within 10 miles of the Albany Pine Bush Preserve (APBP)

B.2 Chi-Square Analyses Comparing Gender Between Survey Respondents and Non-Respondents

Gender	Male	Female	p-value
Respondents	157 (37.0%)	209 (63.0%)	
Non-response	28 (30.9%)	50 (69.1%)	0.312

B.3 Chi-Square Analyses Comparing Distance from the Albany Pine Bush Preserve Between Survey Respondents and Non-Respondents

Distance from the Albany Pine Bush Preserve	< 5 miles	5-10 miles	p-value
Respondents	241 (54.6%)	133 (25.3%)	
Non-response	51 (50.7%)	27 (26.9%)	0.977

B.4 Chi-Square Analyses Comparing Visitorship and Awareness of the Albany Pine Bush Preserve Between Survey Respondents and Non-Respondents

Visitorship	Visited APBP	Never visited, but heard of APBP	Never visited or heard of APBP
Respondents	316 (54.6%)	85 (25.3%)	3 (20.1%)
Non-response	52 (50.7%)	22 (26.9%)	4 (22.4%)
p-value for chi-square	0.04*	0.213	N/A

* $p < 0.05$

B.5 T-test Analyses of Age and Level of Education Between Survey Respondents and Non-Respondents

Variable	Dataset	Non-response	p-value
Age	55.64 ± 14.7	52.94 ± 17.61	0.208
Education	4.96 ± 1.17	4.49 ± 1.20	0.007*

* $p < 0.05$, but no practical difference between the groups

B.6 2015 Census Estimate: Population of individuals living in Albany, Schenectady, Saratoga, and Rensselaer Counties

Albany	Schenectady	Saratoga	Rensselaer
308,432	154,758	226,140	160,101

B.7 Percentage of Survey Respondents Who Lived in Albany, Schenectady, Saratoga, and Rensselaer Counties

Albany	Schenectady	Saratoga	Rensselaer
204 (54.5%)	88 (23.5%)	39 (10.4%)	43 (11.5%)

B.8 2015 Census Estimate: Race by percent for Albany, Schenectady, Saratoga, and Rensselaer Counties in comparison to Survey Respondents

2015 Census Race by Percent	Albany	Schenectady	Saratoga	Rensselaer	4-County Average	Survey Respondents
White	77.0	79.6	93.6	87.1	84.3	91.2
Black	13.9	11.4	1.8	7.4	8.6	0.9
Hispanic	5.9	6.7	3.1	4.7	5.1	1.2
Asian/ Pacific Islander	6.2	4.8	2.6	2.6	4.1	0.5
Native American	0.3	0.7	0.3	0.3	0.4	1.2
2 or more Races	2.6	6.7	3.1	4.7	4.3	2.3

B.9 2015 Census Estimate: Level of Education by percent for Albany, Schenectady, Saratoga, and Rensselaer Counties in comparison to Survey Respondents

2011-2015 Education	Albany	Schenectady	Saratoga	Rensselaer	4-County Average	Survey
High School Diploma	92.8	90.5	94.1	90.8	92.1	99.3
Bachelor's or Higher	38.6	30.5	39	28.6	34.2	73.2

B.10 2015 Census Estimate: Gender by percent Albany, Schenectady, Saratoga, and Rensselaer Counties in comparison to Survey Respondents

2015 Census Gender	Albany	Schenectady	Saratoga	Rensselaer	4-County Average	Survey
Female	51.6	51.3	50.6	50.6	51.0	59.7
Male	48.4	48.7	49.4	49.4	49.0	40.1

B.11 2015 Census Estimate: Median Income for Albany, Schenectady, Saratoga, and Rensselaer Counties in comparison to Survey Respondents

2011-2015	Albany	Schenectady	Saratoga	Rensselaer	4-County Average	Survey
Median income	59,887	58,114	71,496	60,709	62,551.5	73.5% made 60,000+

Appendix C: Chapter 2 Factor Analysis and Scale Reliability

Table C.1: Behavioral intention to support the Albany Pine Bush Preserve

In the next 12 months, how likely are you to do each of the following activities?	
Visit the Albany Pine Bush Preserve	.828
Attend an Albany Pine Bush Preserve program	.858
Donate money in support of the Albany Pine Bush Preserve	.810
Volunteer time at the Albany Pine Bush Preserve	.759
Talk positively about the Albany Pine Bush Preserve to friends, neighbors, and family members	.759
Write letters of support for the Albany Pine Bush Preserve to newspapers, local representatives, or Albany Pine Bush Preserve staff	.644
	$\alpha = 0.870$
	$VE^1 = 60.84\%$
	$\bar{x} = 3.06, \sigma=0.91$

¹Percent of Variance Explained

Table C.2: Personal responsibility

Please indicate whether you agree or disagree with each statement about the Albany Pine Bush Preserve.	
I feel a personal responsibility to support management practices that promote habitat at the Albany Pine Bush preserve.	
I feel a personal responsibility to support the Albany Pine Bush Preserve.	
	$\alpha = 0.872$
	$\bar{x} = 4.10, \sigma=1.07$

Table C.3: Perceived risk

How much risk does each of the following pose to the Albany Pine Bush Preserve?	
Residential development	.834
Commercial development	.917
Lack of financial support	.832
Lack of use/visitors	.820
Non-sanctioned use of the preserve	.774
Extinction of rare plants and animals in the preserve	.805
	$\alpha = 0.816$
	$VE^1 = 69.16\%$
	$\bar{x} = 4.08, \sigma=0.70$

¹Percent of Variance Explained

Table C.4: Effectiveness Knowledge

In your opinion, how effective do you believe the following are at supporting nature preserves?	
Visiting the nature preserve	.679
Attending programs at the nature preserve	.780
Donating money in support of the nature preserve	.774
Volunteering time at the nature preserve	.832
Writing letters of support to newspapers, local representatives, or preserve staff	.769
Talking positively about the nature preserve	.757
	$\alpha = 0.852$
	$VE^1 = 58.74\%$
	$\bar{x} = 4.40, \sigma=0.60$

¹Percent of Variance Explained

Table C.5: Awareness of Management Practices

To the best of your knowledge, what types of practices does the Albany Pine Bush Preserve staff use to maintain the health of the preserve? (Check all that apply)	
Removal of non-native trees and plants	0.830
Cutting trees to create openings in the forest	0.860
Mowing of small trees and shrubs	0.822
Controlled burns (low-intensity fire)	0.739
	$\alpha = 0.829$
	$\bar{x} = 2.47, \sigma = 1.5$

Table C.6: Attitudes towards open trail

Looking at Image B, please indicate whether you agree or disagree with each statement.	
I find this space appealing to look at.	.850
I find this space to be very natural.	.738
I am very likely to use this space for recreation.	.808
I think this space looks healthy.	.875
	$\alpha = 0.875$
	$VE^1 = 36.95\%$
	$\bar{x} = 3.96, \sigma = 0.81$



IMAGE B

¹Percent of Variance Explained

Table C.7: Attitudes towards management practices

How do you feel about the use of the following management practices in natural areas?	Management
Removal of non-native plants and trees	.411
Cutting trees to create openings in the forest	.896
Mowing of bushes and small trees	.894
Controlled burns (low-intensity fire)	.517
	$\alpha = 0.787$
	$\bar{x} = 3.52, \sigma=0.75$

Table C.8: Natural area appreciation

Please indicate whether you agree or disagree with each statement about the Albany Pine Bush Preserve.	
It is important to protect natural areas that are not intended for human use.	.728
It is important to protect natural areas that support rare plants and animals.	.898
It is important to protect rare natural areas.	.894
It is important to protect natural areas in urban regions.	.777
	$\alpha = 0.838$
	$VE^1 = 71.30\%$
	$\bar{x} = 4.69, \sigma=0.48$

¹Percent of Variance Explained

Table C.9: Environmental identity

How strongly do you agree or disagree with the following statements?	
I spend a lot of my time in natural settings (woods, ocean, mountains, lake, desert).	.822
I think of myself as a part of nature not separate from it.	.721
Engaging in environmental behaviors is important to me.	.788
If I had enough time and money, I would devote some of it to environmental causes.	.620
I would feel that an important part of my life would be missing if I was not able to get out and enjoy nature from time to time.	.746
Plants and animals have as much right as humans to exist.	.219
I value the existence of endangered species.	.212
	$\alpha = 0.852$
	$\bar{x} = 4.18, \sigma = 0.71$

Appendix D: Chapter 2 Independent Variable Correlation Table

	Attitude towards management practices	Awareness of management practices	Personal responsibility	Perceived risk	Effectiveness knowledge	Attitude towards open trail	Natural area appreciation	Environmental Identity	Distance	Gender	Age	Education	Parent
Attitude towards management practices	--	--	--	--	--	--	--	--	--	--	--	--	--
Awareness of management practices	.413**	--	--	--	--	--	--	--	--	--	--	--	--
Personal responsibility	.196**	.165**	--	--	--	--	--	--	--	--	--	--	--
Perceived risk	0.087	.203**	.122*	--	--	--	--	--	--	--	--	--	--
Effectiveness knowledge	.163**	.137**	.248**	0.004	--	--	--	--	--	--	--	--	--
Attitude towards open trail	.192**	.119*	.258**	-0.008	.287**	--	--	--	--	--	--	--	--
Natural area appreciation	.184**	0.094	.415**	0.093	.325**	.318**	--	--	--	--	--	--	--
Environmental Identity	.166**	.214**	.488**	0.096	.373**	.313**	.553**	--	--	--	--	--	--
Distance	-0.037	-0.043	-0.047	-0.073	0.021	-0.032	-0.006	0.073	--	--	--	--	--
Gender	-0.080	-0.019	0.096	-0.010	.214**	.109*	.256**	.228**	-0.048	--	--	--	--
Age	0.027	-.148**	-0.078	-0.017	-.137*	-.202**	-.194**	-.181**	-0.050	-.249**	--	--	--
Education	.113*	.141**	0.065	-0.039	.202**	0.044	0.077	.185**	0.062	0.074	-.118*	--	--
Parent	-.156**	-.129*	-.110*	-0.048	-0.094	-0.051	-.105*	-.146**	-0.034	-0.038	.149**	-0.024	--

** . Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Community Views of Nature Preserves



Cornell University
Department of Natural Resources
Human Dimensions Research Unit



*Descriptive Analysis: Residents and Visitors within 10 miles of the
APBP*

**Understanding the Public's Views of Nature Preserves in
New York's Capital District**

Research conducted by the
Human Dimensions Research Unit
Department of Natural Resources
Cornell University
in cooperation with the
Albany Pine Bush Preserve

We would like to know about the public's views of nature preserves in New York's Capital District. Nature preserves are natural areas that are managed to protect plants, animals, or physical features of the land. This information will be used to help improve the Albany Pine Bush Preserve's future conservation-related education, communication, and outreach.

Please complete this questionnaire as soon as you can, seal it with the white re-sealable label provided, and drop it in any mailbox; return postage has been paid. We are interested in learning about your experiences and opinions. Your participation in this survey is voluntary, but we sincerely hope you will take just a few minutes to answer our questions. Your identity will be kept confidential and the information you give us will never be associated with your name.

THANK YOU FOR YOUR HELP!

VIEWS ON NATURAL AREAS

Natural areas are spaces without much human development that consist of grass, trees, or other vegetation.

IMAGE A



- 1. Looking at Image A, please indicate whether you agree or disagree with each statement.**
(Check one box for each row)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I find this space appealing to look at. (<i>n=434, $\bar{x}=4.6$</i>)	10 (2.3%)	4 (0.9%)	11 (2.5%)	122 (28.1%)	287 (66.1%)
I find this space to be very natural. (<i>n=430, $\bar{x}=4.3$</i>)	9 (2.1%)	9 (2.1%)	34 (7.9%)	189 (44.0%)	189 (44.0%)
I am very likely to use this space for recreation. (<i>n=433, $\bar{x}=4.0$</i>)	14 (3.2%)	24 (5.5%)	68 (15.7%)	152 (35.1%)	175 (40.4%)
I think this space looks healthy. (<i>n=434, $\bar{x}=4.3$</i>)	8 (1.8%)	6 (1.4%)	36 (8.3%)	181 (41.7%)	203 (46.8%)

IMAGE B



2. Looking at Image B, please indicate whether you agree or disagree with each statement.
 (Check one box for each row)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I find this space appealing to look at. ($n=417$, $\bar{x}=4.0$)	8 (1.9%)	17 (4.1%)	66 (15.8%)	185 (44.4%)	141 (33.8%)
I find this space to be very natural. ($n=417$, $\bar{x}=4.0$)	7 (1.7%)	25 (6.0%)	71 (17.0%)	189 (45.3%)	125 (30.0%)
I am very likely to use this space for recreation. ($n=417$, $\bar{x}=3.7$)	13 (3.1%)	45 (10.8%)	99 (23.7%)	151 (36.2%)	109 (26.1%)
I think this space looks healthy. ($n=416$, $\bar{x}=4.0$)	7 (1.7%)	20 (4.8%)	85 (20.4%)	178 (42.8%)	126 (30.3%)

3. Please indicate how strongly you agree or disagree with each statement about protecting natural areas. (Check one box for each statement)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
It is important to protect natural areas that support rare plants and animals. (<i>n</i> =406, \bar{x} =4.8)	0 (0.0%)	1 (0.2%)	6 (1.5%)	75 (18.5%)	324 (79.8%)
It is important to protect rare natural areas. (<i>n</i> =406, \bar{x} =4.8)	0 (0.0%)	2 (0.5%)	6 (1.5%)	72 (17.7%)	326 (80.3%)
It is important to protect natural areas for human use. (<i>n</i> =408, \bar{x} =4.2)	3 (0.7%)	12 (2.9%)	59 (14.5%)	155 (38.0%)	179 (43.9%)
It is important to protect natural areas in urban regions. (<i>n</i> =407, \bar{x} =4.6)	0 (0.0%)	1 (0.2%)	14 (3.4%)	127 (31.2%)	265 (65.1%)
It is important to protect natural areas that are not intended for human use. (<i>n</i> =405, \bar{x} =4.6)	4 (1.0%)	4 (1.0%)	22 (5.4%)	103 (25.4%)	272 (67.2%)

4. How do you feel about the use of the following management practices in natural areas? (Check one box for each statement)

	Very Negative	Negative	Neutral	Positive	Very Positive
Removal of non-native plants and trees. (<i>n</i> =406, \bar{x} =3.9)	10 (2.5%)	19 (4.7%)	105 (25.9%)	164 (40.4%)	108 (26.6%)
Cutting trees to create openings in the forest. (<i>n</i> =405, \bar{x} =3.2)	19 (4.7%)	70 (17.3%)	165 (40.7%)	110 (27.2%)	41 (10.1%)
Mowing of bushes and small trees. (<i>n</i> =408, \bar{x} =3.1)	23 (5.6%)	84 (20.6%)	181 (44.4%)	85 (20.8%)	35 (8.6%)

	Very Negative	Negative	Neutral	Positive	Very Positive
Controlled burns (low-intensity fire). ($n=408$, $\bar{x}=3$.)	8 (2.0%)	16 (3.9%)	116 (28.4%)	172 (42.2%)	96 (23.5%)
Closing trails near environmentally sensitive areas. ($n=406$, $\bar{x}=4.1$)	11 (2.7%)	22 (5.4%)	59 (14.5%)	159 (39.2%)	155 (38.2%)

ALBANY PINE BUSH PRESERVE

5. Which of the following best applies to you? (Check only one) ($n=404$)

- I have visited the Albany Pine Bush Preserve. **316 (78.2%)**
(Continue to Question 6)
- I have heard of the Albany Pine Bush Preserve, but never visited it. **85 (21.0%)**
(Skip to Question 13)
- I have never heard of the Albany Pine Bush Preserve. **2 (0.7%)**
(Skip to Question 18)

6. How many times have you visited the Albany Pine Bush Preserve in the last 12 months? (Check only one) ($n=311$)

- None **71 (22.5%)** 13-24 **13 (4.1%)**
- 1-5 **165 (52.2%)** 25-51 **9 (2.8%)**
- 6-12 **43 (13.6%)** 52+ **15 (4.7%)**

7. What types of self-led activities have you done when visiting the Albany Pine Bush Preserve? (Check all that apply) ($n=310$)

- Hike/walk **274 (88.1%)**
- Run **14 (4.5%)**
- Bike **20 (6.4%)**
- Animal watching (e.g. birds, mammals, butterflies) **147 (47.3%)**
- Other _____ **78 (25.1%)**

8. What types of Albany Pine Bush-directed programs have you done when visiting the Albany Pine Bush Preserve? (Check all that apply) (n= 310)

- Science Lecture Series **70 (22.6%)**
- Citizen Science **27 (8.7%)**
- Animal-Related (e.g. turtles, owls, coyotes, etc.) **103 (33.2%)**
- Staff-led hikes **111 (35.8%)**
- Child/youth programming **110 (35.5%)**
- None **90 (29.0%)**

9. How strongly do you agree or disagree with the following statements? (Check one box for each statement)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The Albany Pine Bush Preserve means a great deal to me. (n=313, \bar{x} =4.2)	1 (0.3%)	3 (1.0%)	47 (15.0%)	133 (42.5%)	129 (41.2%)
Visiting the Albany Pine Bush Preserve says a lot about who I am. (n=312, \bar{x} =3.5)	12 (3.8%)	30 (9.6%)	105 (33.7%)	121 (38.8%)	44 (14.1%)
I feel I can really be myself in the Albany Pine Bush Preserve. (n=311, \bar{x} =3.6)	6 (1.9%)	21 (6.8%)	123 (39.5%)	112 (36.0%)	49 (15.8%)
The Albany Pine Bush Preserve is the best place for what I like to do. (n=310, \bar{x} =3.1)	15 (4.8%)	59 (19.0%)	147 (47.4%)	72 (23.2%)	17 (5.5%)
I get more satisfaction out of visiting the Albany Pine Bush Preserve than most other natural areas. (n=312, \bar{x} =2.9)	20 (6.4%)	75 (24.0%)	156 (50.0%)	45 (14.4%)	16 (5.1%)
I wouldn't substitute any other area for doing the types of things I do at the Albany Pine Bush Preserve. (n=310, \bar{x} =2.8)	35 (11.3%)	81 (26.1%)	138 (44.5%)	40 (12.9%)	16 (5.2%)

10. What does the Albany Pine Bush Preserve mean to you? (Check all that apply) (n=308)

- It is where I recreate (e.g. run, bike, walk) **161 (52.3%)**
- It is where I go to relax **134 (43.5%)**
- It is where I socialize with people (e.g. friends, children, family) **69 (22.4%)**
- It is where I go to learn (Discovery Center, programs, etc.) **177 (57.5%)**
- Other _____ **70 (22.7%)**

11. What do you value most about the Albany Pine Bush Preserve? (Check only one) (n=314)

- Trails **88 (28.0%)**
- Discovery Center **49 (15.6%)**
- Wildlife **60 (19.2%)**
- Ecosystem **99 (31.5%)**
- Programs **49 (15.6%)**
- Proximity **22 (7.0%)**
- Aesthetic/Views **23 (7.3%)**
- Other _____ **9 (2.9%)**

12. In each row, circle the number that best reflects how you feel while visiting the Albany Pine Bush Preserve.

	1	2	3	4	5	
Bored (n=305, \bar{x} =4.3)	6 (2.0%)	5 (1.6%)	35 (11.5%)	115 (37.7%)	144 (47.2%)	Interested
Tense (n=293, \bar{x} =4.2)	14 (4.8%)	8 (2.7%)	24 (8.2%)	98 (33.4%)	149 (50.9%)	Relaxed
Sad (n=289, \bar{x} =4.1)	20 (6.9%)	8 (2.8%)	29 (10.0%)	98 (33.9%)	134 (46.4%)	Happy
Agitated (n=280, \bar{x} = 4.1)	23 (8.2%)	6 (2.1%)	22 (7.9%)	88 (31.4%)	141 (50.4%)	Calm

13. Please indicate whether you agree or disagree with each statement about the Albany Pine Bush Preserve. (Check one box for each statement)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am fond of the Albany Pine Bush Preserve. (<i>n</i> =395, \bar{x} = 4.6)	4 (1.0%)	2 (0.5%)	66 (16.7%)	0 (0.0%)	323 (81.8%)
I have strong, positive feelings for the Albany Pine Bush Preserve. (<i>n</i> =397, \bar{x} = 4.5)	3 (0.8%)	5 (1.3%)	88 (22.2%)	1 (0.3%)	300 (75.6%)
It is important that the Albany Pine Bush Preserve remain a protected preserve. (<i>n</i> =399, \bar{x} = 4.9)	0 (0.0%)	1 (0.3%)	13 (3.3%)	0 (0.0%)	385 (96.5%)
I feel a personal responsibility to support management practices that promote habitat at the Albany Pine Bush preserve. (<i>n</i> =399, \bar{x} = 4.2)	5 (1.3%)	21 (5.3%)	127 (31.8%)	1 (0.3%)	245 (61.4%)
I feel a personal responsibility to support the Albany Pine Bush Preserve. (<i>n</i> =398, \bar{x} = 4.0)	8 (2.0%)	31 (7.8%)	143 (35.9%)	0 (0.0%)	216 (54.3%)

14. How much risk does each of the following pose to the Albany Pine Bush Preserve?
(Check one box for each statement)

Means, percentages, and n's were calculated only for meaningful responses (None-Very High).

	None	Low	Medium	High	Very High	Don't Know
Residential development (<i>n</i> =229, \bar{x} = 3.8)	49 (21.4%)	5 (2.2%)	10 (4.4%)	46 (20.1%)	119 (52.0%)	155 (40.4%)*

	None	Low	Medium	High	Very High	Don't Know
Commercial development (<i>n</i> =176, \bar{x} = 3.7)	42 (29.3%)	3 (1.4%)	10 (5.1%)	28 (14.4%)	93 (49.8%)	208 (54.2%)*
Lack of financial support (<i>n</i> =262, \bar{x} = 3.6)	69 (26.3%)	3 (1.1%)	11 (4.2%)	55 (21.0%)	124 (47.3%)	119 (31.2%)*
Lack of use/visitors (<i>n</i> =332, \bar{x} = 3.2)	80 (24.1%)	14 (4.2%)	64 (19.3%)	99 (29.8%)	75 (22.6%)	53 (13.8%)*
Non-sanctioned use of the preserve (<i>n</i> =290, \bar{x} = 3.1)	107 (36.9%)	2 (0.7%)	25 (8.6%)	66 (22.8%)	90 (31.0%)	95 (24.7%)*
Extinction of rare plants and animals in the preserve (<i>n</i> =233, \bar{x} = 3.4)	73 (31.3%)	2 (0.9%)	14 (6.0%)	52 (22.3%)	92 (39.5%)	152 (39.5%)*

*"Don't know" percentages reflect percentage of all individuals that answered the question.

15. To the best of your knowledge, please indicate whether the following statements are True or False.

- a. The Albany Pine Bush Preserve ecosystem is reliant on frequent disturbances to the land (e.g. fires). (*n*=371)
 - True **287 (77.4%)** False **84 (22.6%)**
- b. The Albany Pine Bush Preserve only has land in Albany, NY. (*n*=363)
 - True **241 (66.4%)** False **122 (33.6%)**
- c. New York State Law mandates the protection of the Albany Pine Bush Preserve. (*n*=362)
 - True **237 (65.5%)** False **125 (34.5%)**
- d. The Albany Pine Bush Preserve is a rare habitat. (*n*=372)
 - True **355 (95.4%)** False **17 (4.6%)**

e. The Albany Pine Bush Preserve is nationally recognized. ($n=359$)
 True **304 (84.7%)** False **55 (15.3%)**

f. The Albany Pine Bush is unique because of its plants and animals. ($n=370$)
 True **354 (95.7%)** False **16 (4.3%)**

16. To the best of your knowledge, what are the goals of the Albany Pine Bush Preserve?
(Check all that apply) (n=381)

- Provide green space (natural area) for public use **331 (86.4%)**
- Protect the Karner Blue Butterfly **340 (89.2%)**
- Protect the ecosystem **336 (88.2%)**
- Educate the public **331 (86.9%)**
- Other _____ **20 (5.2%)**
- I don't know **20 (5.2%)**

17. To the best of your knowledge, what types of practices does the Albany Pine Bush Preserve use to maintain the health of the preserve? *(Check all that apply) (n=381)*

- Removal of non-native trees and plants **256 (67.2%)**
- Cutting trees to create openings in the forest **187 (49.1%)**
- Mowing of small trees and shrubs **163 (42.8%)**
- Controlled burns (low-intensity fire) **315 (82.7%)**
- Closing trails near environmentally sensitive areas **247 (64.8%)**
- I don't know **73 (19.2%)**

PROTECTING NATURE PRESERVES

We would like your opinion on activities that can be done to support nature preserves.

18. In your opinion, how effective do you believe the following are at supporting nature preserves? *(Check one box for each statement)*

	Very Ineffective	Slightly Ineffective	Neither	Slightly Effective	Very Effective
Visiting the nature preserve <i>(n=373, \bar{x} = 4.4)</i>	4 (1.1%)	3 (0.8%)	32 (8.6%)	139 (37.3%)	195 (52.3%)

	Very Ineffective	Slightly Ineffective	Neither	Slightly Effective	Very Effective
Attending programs at the nature preserve ($n=374$, $\bar{x}=4.4$)	3 (0.8%)	0 (0.0%)	34 (9.1%)	158 (42.2%)	179 (47.9%)
Donating money in support of the nature preserve ($n=374$, $\bar{x}=4.5$)	4 (1.1%)	3 (0.8%)	35 (9.4%)	93 (24.9%)	239 (63.9%)
Volunteering time at the nature preserve ($n=373$, $\bar{x}=4.4$)	3 (0.8%)	2 (0.5%)	44 (11.8%)	128 (34.3%)	196 (52.5%)
Writing letters of support to newspapers, local representatives, or preserve staff ($n=372$, $\bar{x}=4.2$)	5 (1.3%)	10 (2.7%)	61 (16.4%)	128 (34.4%)	168 (45.2%)
Talking positively about the nature preserve ($n=375$, $\bar{x}=4.4$)	6 (1.6%)	4 (1.1%)	28 (7.5%)	144 (38.4%)	193 (51.5%)

19. In the next 12 months how likely are you to do each of the following activities? (Check one box for each statement)

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely Likely
Visit the Albany Pine Bush Preserve ($n=377$, $\bar{x}=3.7$)	29 (7.7%)	53 (14.1%)	47 (12.5%)	112 (29.7%)	136 (36.1%)
Attend an Albany Pine Bush Preserve program ($n=377$, $\bar{x}=3.3$)	39 (10.3%)	71 (18.8%)	96 (25.5%)	100 (26.5%)	71 (18.8%)
Donate money in support of the Albany Pine Bush Preserve ($n=376$, $\bar{x}=2.8$)	52 (13.8%)	97 (25.8%)	121 (32.2%)	82 (21.8%)	24 (6.4%)
Volunteer time at the Albany Pine Bush Preserve ($n=368$, $\bar{x}=2.3$)	86 (23.4%)	153 (41.6%)	87 (23.6%)	30 (8.2%)	12 (3.3%)

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely Likely
Oppose cutting trees to create openings in the Albany Pine Bush Preserve ($n=365$, $\bar{x}=2.3$)	114 (31.2%)	97 (26.6%)	108 (29.6%)	35 (9.6%)	11 (3.0%)
Oppose the use of controlled burns (low-intensity fires) to promote plant and animal diversity at the Albany Pine Bush Preserve ($n=366$, $\bar{x}=1.8$)	173 (47.3%)	114 (31.1%)	59 (16.1%)	13 (3.6%)	7 (1.9%)
Write letters of support for the Albany Pine Bush Preserve to newspapers, local representatives, or Albany Pine Bush Preserve staff ($n=366$, $\bar{x}=2.3$)	91 (24.9%)	136 (37.2%)	95 (26.0%)	32 (8.7%)	12 (3.3%)
Oppose the mowing of small trees and shrubs at the Albany Pine Bush Preserve ($n=363$, $\bar{x}=2.1$)	124 (34.2%)	108 (29.8%)	102 (28.1%)	20 (5.5%)	9 (2.5%)
Oppose the closure of trails that protect sensitive habitat in the Albany Pine Bush Preserve ($n=364$, $\bar{x}=2.0$)	152 (41.8%)	119 (32.7%)	59 (16.2%)	19 (5.2%)	15 (4.1%)
Oppose the removal of non-native trees and plants to promote plant and animal diversity at the Albany Pine Bush Preserve ($n=363$, $\bar{x}=1.9$)	161 (44.4%)	109 (30.0%)	63 (17.4%)	20 (5.5%)	10 (2.8%)
Talk positively about the Albany Pine Bush Preserve to friends, neighbors, and family members ($n=365$, $\bar{x}=4.0$)	26 (7.1%)	15 (4.1%)	54 (14.8%)	129 (35.3%)	141 (38.6%)

20. How strongly do you agree or disagree with the following statements? (Check one box for each statement)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am a supporter of the Albany Pine Bush Preserve. ($n=368$, $\bar{x}=3.8$)	12 (3.3%)	13 (3.5%)	101 (27.4%)	139 (37.8%)	103 (28.0%)
I spend a lot of my time in natural settings (woods, ocean, mountains, lake, desert). ($n=367$, $\bar{x}=3.8$)	12 (3.3%)	38 (10.4%)	74 (20.2%)	134 (36.5%)	109 (29.7%)
I think of myself as a part of nature not separate from it. ($n=364$, $\bar{x}=4.1$)	7 (1.9%)	12 (3.3%)	56 (15.4%)	158 (43.4%)	131 (36.0%)
Engaging in environmental behaviors is important to me. ($n=363$, $\bar{x}=4.2$)	2 (0.6%)	11 (3.0%)	47 (12.9%)	156 (43.0%)	147 (40.5%)
If I had enough time and money, I would definitely devote some of it to environmental causes. ($n=367$, $\bar{x}=4.1$)	8 (2.2%)	20 (5.4%)	41 (11.2%)	146 (39.8%)	152 (41.4%)
I would feel that an important part of my life would be missing if I was not able to get out and enjoy nature from time to time. ($n=366$, $\bar{x}=4.5$)	4 (1.1%)	6 (1.6%)	17 (4.6%)	108 (29.5%)	231 (63.1%)
Plants and animals have as much right as humans to exist. ($n=366$, $\bar{x}=4.3$)	14 (3.8%)	9 (2.5%)	28 (7.7%)	105 (28.7%)	210 (57.4%)
I value the existence of endangered species. ($n=366$, $\bar{x}=4.6$)	0 (0.0%)	0 (0.0%)	16 (4.4%)	105 (28.7%)	245 (66.9%)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There is not much that any one individual can do about the environment. <i>(n=364, $\bar{x}=1.0$)</i>	119 (32.7%)	165 (45.3%)	49 (13.5%)	22 (6.0%)	9 (2.5%)
The conservation efforts of one person are useless as long as other people refuse to conserve. <i>(n=364, $\bar{x}=1.1$)</i>	113 (31.0%)	154 (42.3%)	42 (11.5%)	42 (11.5%)	13 (3.6%)

BACKGROUND INFORMATION

21. Do you consider yourself an environmentalist? *(n= 356)*

Yes, Definitely **132 (37.1%)**

No **47 (13.2%)**

Yes, Somewhat **177 (49.7%)**

22. In what year were you born? *n=362 $\bar{x}=1960$ $\bar{\sigma}=14.70$ Range 1918-1997*

23. How long have you lived in New York's Capital District? _____years

- *n=363 $\bar{x}=38.25$ years Range: 1-99 years*

24. Are you currently a member of the Friends of the Pine Bush? *(n=374)*

Yes **33 (8.8%)**

No **341 (91.2%)**

25. Are you currently a member of Save the Pine Bush? *(n=373)*

Yes **13 (3.5%)**

No **360 (96.5%)**

26. Do you have children? *(n=372)*

Yes **263 (70.7%)**

No **109 (29.0%)**

27. How old are your children? *(Check all that apply) (n=129)*

0-2 **17 (13.2%)**

10-14 **46 (35.7%)**

3-5 **30 (23.3%)**

15-18 **47 (36.4%)**

6-9 **40 (31.0%)**

28. What is the highest level of education you have completed? (n=369)

Less than high school diploma	High school diploma	Some college	2-year College Degree	4-year College Degree	Graduate/ Professional degree
1 (0.3%)	26 (7.0%)	30 (8.1%)	40 (10.8%)	103 (27.9%)	169 (45.8%)

30. What was the total income of your household before taxes last year? (325)

\$0-19,999	\$20,000-39,999	\$40,000-59,999	\$60,000-79,999	\$80,000-99,999	\$100,000+
5 (1.5%)	31 (9.5%)	55 (16.9%)	48 (14.8%)	56 (17.2%)	130 (40%)

31. What is your Race/Ethnicity? (Check all that apply) (n=361)

White **336 (93.1%)** Asian or Pacific Islander **3 (0.8%)**
 Black or African-American **5 (1.4%)** Native American Indian **10 (2.8%)**
 Hispanic or Latino **4 (1.1%)** Other _____ **10 (2.3%)**

White vs. Non-White (n=361)

White **338 (93.9%)** Mixed (2+ races) **7 (1.9%)** Non-White **15 (4.2%)**

32. What is your Gender? (n=366)

Male **157 (42.9%)** Female **209 (57.1%)**

County (n=374)

Albany	Schenectady	Saratoga	Rensselaer
204 (54.5%)	88 (23.5%)	39 (10.4%)	43 (11.5%)

Distance from Preserve (n=374)

Within 5 miles	Between 5 and 10 miles
241 (64.4%)	133 (35.6%)

Thank you for your time and effort!

To return this questionnaire, simply seal it with the white removable seal, and drop it in the mail (return postage has been paid).

You can also use the space below to offer any additional comments you would like to make about the Albany Pine Bush Preserve generally.

Appendix F: Chapter 3 Non-Response Survey and Bias Analyses

F.1 Non-Response Survey

1) First, could you tell me which of the following best applies to you?

- 1--I have visited the Albany Pine Bush Preserve.
- 2--I have heard of the Albany Pine Bush Preserve, but never visited it.
- 3--I have never heard of the Albany Pine Bush Preserve.

2) In what year were you born?

3) What municipality (e.g. city, town, hamlet, village) do you live in?

4) What is the highest level of school you have completed or the highest degree you have received?

- 0--Less than high school diploma
- 1--High School diploma
- 2--Some college
- 3--2-year college degree
- 4--4-year college degree
- 5--Graduate/ Professional Degree

5) Please indicate whether you agree or disagree with the following statement about the Albany Pine Bush:

It is important to protect natural areas that support rare plants and animals.

- 1--Strongly disagree
- 2--Disagree
- 3--Neutral
- 4--Agree
- 5--Strongly Agree

If never heard of READ: The Albany Pine Bush Preserve is a 3,200-acre nature preserve just north of Albany, New York with over 18 miles of trails, a variety of wildlife, and an indoor discovery center.

6) In the next 12 months, how likely are you to visit the Albany Pine Bush Preserve?

- 1--Extremely Unlikely
- 2--Unlikely
- 3--Neutral
- 4--Likely
- 5- Extremely Likely

7) We are interested in improving our response rate for future studies, could you please tell me a little about why you did not complete the email survey?

Record Gender: 0 Male 1 Female 2 Unknown

Chi-Square and T-test Analyses were conducted for survey respondents and non-respondents who had visited the Albany Pine Bush Preserve

F.2 Chi-Square Analyses Comparing Gender Between Survey Respondents and Non-Respondents

Gender	Male	Female	p-value
Respondents	126 (37.0%)	215 (63.0%)	
Non-response	21 (30.9%)	47 (69.1%)	0.416

F.3 Chi-Square Analyses Comparing Distance from the Albany Pine Bush Preserve Between Survey Respondents and Non-Respondents

Distance from APBP	< 5 miles	5-10 miles	>10 miles	p-value
Respondents	190 (54.6%)	88 (25.3%)	70 (20.1%)	
Non-response	34 (50.7%)	18 (26.9%)	15 (22.4%)	0.839

F.4 T-test Analyses of Age and Level of Education Between Survey Respondents and Non-Respondents

Variable	Respondents	Non-response	p-value
Age	52.37 ± 14.2	49.62 ± 15.67	0.18
Education	5.04 ± 1.17	4.84 ± 1.20	0.20

Appendix G: Chapter 3 Factor Analysis and Scale Reliability

Table G.1: Affective Response

How strongly do you agree or disagree with the following statements?	
I spend a lot of my time in natural settings (woods, ocean, mountains, lake, desert).	.843
I think of myself as a part of nature not separate from it.	.883
Engaging in environmental behaviors is important to me.	.879
	$\alpha = 0.891$
	$VE^1 = 22.68\%$
	$\bar{x} = 4.20, \sigma = 0.97$

¹Percent of Variance Explained

Table G.2: Place Attachment

How much do you agree or disagree with the following statements?	
The Albany Pine Bush Preserve means a great deal to me.	.719
Visiting the Albany Pine Bush Preserve says a lot about who I am.	.776
I feel I can really be myself in the Albany Pine Bush Preserve.	.739
The Albany Pine Bush Preserve is the best place for what I like to do.	.799
I get more satisfaction out of visiting the Albany Pine Bush Preserve than most other natural areas.	.804
I wouldn't substitute any other area for doing the types of things I do at the Albany Pine Bush Preserve.	.757
I am fond of the Albany Pine Bush Preserve.	.577
I have strong, positive feelings for the Albany Pine Bush Preserve.	.687
	$\alpha = 0.891$
	$VE^1 = 40.60\%$
	$\bar{x} = 3.69, \sigma = 0.65$

¹Percent of Variance Explained

Table G.3: Behavioral intention to support the Albany Pine Bush Preserve

In the next 12 months how likely are you to do each of the following activities?	
Visit the Albany Pine Bush Preserve	.828
Attend an Albany Pine Bush Preserve program	.858
Donate money in support of the Albany Pine Bush Preserve	.810
Volunteer time at the Albany Pine Bush Preserve	.759
Talk positively about the Albany Pine Bush Preserve to friends, neighbors, and family members	.759
Write letters of support for the Albany Pine Bush Preserve to newspapers, local representatives, or Albany Pine Bush Preserve staff	.644
	$\alpha = 0.870$
	VE ¹ = 60.84%
	$\bar{x} = 3.21, \sigma=0.82$

¹Percent of Variance Explained

Table G.4: Perceived risk

How much risk does each of the following pose to the Albany Pine Bush Preserve?	
Residential development	.834
Commercial development	.917
Lack of financial support	.832
Lack of use/visitors	.820
Non-sanctioned use of the preserve	.774
Extinction of rare plants and animals in the preserve	.805
	$\alpha = 0.816$
	VE = 69.16%
	$\bar{x} = 4.11, \sigma=0.69$

¹Percent of Variance Explained

Table G.5: Environmental identity

How strongly do you agree or disagree with the following statements?	
I spend a lot of my time in natural settings (woods, ocean, mountains, lake, desert).	.822
I think of myself as a part of nature not separate from it.	.721
Engaging in environmental behaviors is important to me.	.788
If I had enough time and money, I would definitely devote some of it to environmental causes.	.620
I would feel that an important part of my life would be missing if I was not able to get out and enjoy nature from time to time.	.746
Plants and animals have as much right as humans to exist.	.219
I value the existence of endangered species.	.212
	$\alpha = 0.852$
	$\bar{x} = 4.39, \sigma = 0.56$

Appendix H: Chapter 3 Independent Variable Correlation Table

	Aesthetic Landscape Preference	Recreational Landscape Preference	Affective Response	Place attachment	Environmental Identity	Personal Responsibility	Visitor Typology	Perceived Risk	Distance	Gender	Age	Education
Aesthetic Landscape Preference	--	--	--	--	--	--	--	--	--	--	--	--
Recreational Landscape Preference	.524**	--	--	--	--	--	--	--	--	--	--	--
Affective Response	-.230**	-.123*	--	--	--	--	--	--	--	--	--	--
Place attachment	-.185**	-.147**	.375**	--	--	--	--	--	--	--	--	--
Environmental Identity	-0.097	-.111*	.200**	.437**	--	--	--	--	--	--	--	--
Personal Responsibility	-0.099	-0.051	.261**	.564**	.452**	--	--	--	--	--	--	--
Visitor Typology	-0.044	-0.011	0.043	0.069	0.035	0.015	--	--	--	--	--	--
Perceived Risk	0.088	0.070	0.091	.161**	.243**	.155**	0.057	--	--	--	--	--
Distance from preserve	-.152**	-0.038	0.101	0.034	.166**	0.050	0.091	0.003	--	--	--	--
Gender	0.033	0.010	0.093	.194**	.140*	0.079	.286**	0.113	0.089	--	--	--
Age	0.068	0.041	-0.077	-.127*	-0.065	-0.008	-.121*	-0.017	-.133*	-.215**	--	--
Education	0.083	0.089	0.035	0.043	.137*	0.078	0.084	-.134*	0.031	0.045	-0.035	--

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Community Views of Nature Preserves



Cornell University
Department of Natural Resources
Human Dimensions Research Unit



Descriptive Analysis: Visitors

**Understanding the Public's Views of Nature Preserves in
New York's Capital District**

Research conducted by the
Human Dimensions Research Unit
Department of Natural Resources
Cornell University
in cooperation with the
Albany Pine Bush Preserve

We would like to know about the public's views of nature preserves in New York's Capital District. Nature preserves are natural areas that are managed to protect plants, animals, or physical features of the land. This information will be used to help improve the Albany Pine Bush Preserve's future conservation-related education, communication, and outreach.

Please complete this questionnaire as soon as you can, seal it with the white re-sealable label provided, and drop it in any mailbox; return postage has been paid. We are interested in learning about your experiences and opinions. Your participation in this survey is voluntary, but we sincerely hope you will take just a few minutes to answer our questions. Your identity will be kept confidential and the information you give us will never be associated with your name.

THANK YOU FOR YOUR HELP!

VIEWS ON NATURAL AREAS

Natural areas are spaces without much human development that consist of grass, trees, or other vegetation.

IMAGE A



22. Looking at Image A, please indicate whether you agree or disagree with each statement.
(Check one box for each row)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I find this space appealing to look at. ($n=386$, $\bar{x}=4.6$)	9 (2.3%)	1 (0.3%)	8 (2.1%)	92 (23.8%)	276 (71.5%)
I find this space to be very natural. ($n=385$, $\bar{x}=4.3$)	7 (1.8%)	7 (1.8%)	32 (8.3%)	166 (43.1%)	173 (44.9%)
I am very likely to use this space for recreation. ($n=385$, $\bar{x}=4.1$)	6 (1.6%)	8 (2.1%)	46 (11.9%)	133 (34.5%)	192 (49.9%)
I think this space looks healthy. ($n=386$, $\bar{x}=4.3$)	6 (1.6%)	4 (1.0%)	31 (8.0%)	152 (39.4%)	193 (50.0%)

IMAGE B



23. Looking at Image B, please indicate whether you agree or disagree with each statement.
(Check one box for each row)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I find this space appealing to look at. ($n=383$, $\bar{x}=4.2$)	5 (1.3%)	9 (2.3%)	47 (12.3%)	166 (43.3%)	156 (40.7%)
I find this space to be very natural. ($n=383$, $\bar{x}=4.0$)	6 (1.6%)	19 (5.0%)	56 (14.6%)	180 (47.0%)	122 (31.9%)
I am very likely to use this space for recreation. ($n=382$, $\bar{x}=4.0$)	7 (1.8%)	24 (6.3%)	74 (19.4%)	149 (39.0%)	128 (33.5%)
I think this space looks healthy. ($n=382$, $\bar{x}=4.1$)	5 (1.3%)	10 (2.6%)	67 (17.5%)	165 (43.2%)	135 (35.3%)

24. Please indicate how strongly you agree or disagree with each statement about protecting natural areas. (Check one box for each statement)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
It is important to protect natural areas that support rare plants and animals. ($n=381$, $\bar{x}=4.8$)	1 (0.3%)	1 (0.3%)	3 (0.8%)	55 (14.4%)	321 (84.3%)
It is important to protect rare natural areas. ($n=381$, $\bar{x}=4.8$)	1 (0.3%)	1 (0.3%)	5 (1.3%)	54 (14.2%)	320 (84.0%)
It is important to protect natural areas for human use. ($n=383$, $\bar{x}=4.3$)	4 (1.0%)	6 (1.6%)	48 (12.5%)	144 (37.6%)	181 (47.3%)
It is important to protect natural areas in urban regions. ($n=381$, $\bar{x}=4.7$)	1 (0.3%)	0 (0.0%)	11 (2.9%)	99 (26.0%)	270 (70.9%)
It is important to protect natural areas that are not intended for human use. ($n=382$, $\bar{x}=4.6$)	3 (0.8%)	3 (0.8%)	18 (4.7%)	84 (22.0%)	274 (71.7%)

25. How do you feel about the use of the following management practices in natural areas? (Check one box for each statement)

	Very Negative	Negative	Neutral	Positive	Very Positive
Removal of non-native plants and trees. ($n=381$, $\bar{x}=4.0$)	7 (1.8%)	17 (4.5%)	81 (21.3%)	150 (39.4%)	126 (33.1%)
Cutting trees to create openings in the forest. ($n=380$, $\bar{x}=3.3$)	16 (4.2%)	56 (14.7%)	159 (41.8%)	104 (27.4%)	45 (11.8%)
Mowing of bushes and small trees. ($n=382$, $\bar{x}=3.1$)	18 (4.7%)	80 (20.9%)	167 (43.7%)	78 (20.4%)	39 (10.2%)

	Very Negative	Negative	Neutral	Positive	Very Positive
Controlled burns (low-intensity fire). ($n=383$, $\bar{x}=4.0$)	4 (1.0%)	10 (2.6%)	91 (23.8%)	174 (45.4%)	104 (27.2%)
Closing trails near environmentally sensitive areas. ($n=381$, $\bar{x}=4.2$)	5 (1.3%)	18 (4.7%)	51 (13.4%)	144 (37.8%)	163 (42.8%)

ALBANY PINE BUSH PRESERVE

26. Which of the following best applies to you? (Check only one) ($n=475$)

- I have visited the Albany Pine Bush Preserve. **386 (100.0%)**
(Continue to Question 6)
- I have heard of the Albany Pine Bush Preserve, but never visited it. **0 (0.0%)**
(Skip to Question 13)
- I have never heard of the Albany Pine Bush Preserve. **0 (0.0%)**
(Skip to Question 18)

27. How many times have you visited the Albany Pine Bush Preserve in the last 12 months? (Check only one) ($n=386$)

- None **92 (23.8%)** 13-24 **16 (4.1%)**
- 1-5 **201 (52.1%)** 25-51 **10 (2.6%)**
- 6-12 **52 (13.5%)** 52+ **15 (3.9%)**

28. What types of self-led activities have you done when visiting the Albany Pine Bush Preserve? (Check all that apply) ($n=376$)

- Hike/walk **330 (87.8%)**
- Run **19 (5.1%)**
- Bike **22 (5.9%)**
- Animal watching (e.g. birds, mammals, butterflies) **195 (51.9%)**
- Other _____ **99 (26.3%)**

29. What types of Albany Pine Bush-directed programs have you done when visiting the Albany Pine Bush Preserve? (Check all that apply) (n= 379)

- Science Lecture Series **83 (21.9%)**
- Citizen Science **31 (8.2%)**
- Animal-Related (e.g. turtles, owls, coyotes, etc.) **132 (34.8%)**
- Staff-led hikes **146 (38.5%)**
- Child/youth programming **131 (34.6%)**
- None **102 (26.8%)**

30. How strongly do you agree or disagree with the following statements? (Check one box for each statement)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The Albany Pine Bush Preserve means a great deal to me. (n=383, \bar{x} =4.2)	1 (0.3%)	3 (0.8%)	55 (14.4%)	169 (44.1%)	155 (40.5%)
Visiting the Albany Pine Bush Preserve says a lot about who I am. (n=382, \bar{x} =3.5)	13 (3.4%)	34 (8.9%)	129 (33.8%)	155 (40.6%)	51 (13.4%)
I feel I can really be myself in the Albany Pine Bush Preserve. (n=381, \bar{x} =3.6)	6 (1.6%)	23 (6.0%)	147 (38.6%)	144 (37.8%)	61 (16.0%)
The Albany Pine Bush Preserve is the best place for what I like to do. (n=380, \bar{x} =3.1)	16 (4.2%)	69 (18.2%)	182 (47.9%)	90 (23.7%)	23 (6.1%)
I get more satisfaction out of visiting the Albany Pine Bush Preserve than most other natural areas. (n=382, \bar{x} =2.9)	21 (5.5%)	93 (24.3%)	192 (50.3%)	59 (15.4%)	17 (4.5%)
I wouldn't substitute any other area for doing the types of things I do at the Albany Pine Bush Preserve. (n=379, \bar{x} =2.8)	37 (9.8%)	100 (26.4%)	173 (45.6%)	51 (13.5%)	18 (4.7%)

31. What does the Albany Pine Bush Preserve mean to you? (Check all that apply) (n=378)

- It is where I recreate (e.g. run, bike, walk) **199 (52.6%)**
- It is where I go to relax **161 (42.6%)**
- It is where I socialize with people (e.g. friends, children, family) **84 (22.2%)**
- It is where I go to learn (Discovery Center, programs, etc.) **226 (59.8%)**
- Other _____ **89 (23.5%)**

32. What do you value most about the Albany Pine Bush Preserve? (Check only one) (n=384)

- Trails **100 (26.0%)**
- Discovery Center **56 (14.6%)**
- Wildlife **68 (17.7%)**
- Ecosystem **127 (33.1%)**
- Programs **62 (16.1%)**
- Proximity **22 (5.7%)**
- Aesthetic/Views **24 (6.3%)**
- Other _____ **11 (2.9%)**

33. In each row, circle the number that best reflects how you feel while visiting the Albany Pine Bush Preserve.

	1	2	3	4	5	
Bored (n=373, \bar{x} =4.3)	6 (1.6%)	6 (1.6%)	39 (10.5%)	135 (36.2%)	187 (50.1%)	Interested
Tense (n=361, \bar{x} =4.3)	14 (3.9%)	8 (2.2%)	27 (7.5%)	123 (34.1%)	189 (52.4%)	Relaxed
Sad (n=355, \bar{x} =4.2)	22 (6.2%)	9 (2.5%)	32 (9.0%)	119 (33.5%)	173 (48.7%)	Happy
Agitated (n=346, \bar{x} = 4.2)	27 (7.8%)	6 (1.7%)	25 (7.2%)	112 (32.4%)	176 (50.9%)	Calm

34. Please indicate whether you agree or disagree with each statement about the Albany Pine Bush Preserve. (Check one box for each statement)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am fond of the Albany Pine Bush Preserve. (<i>n</i> =467, \bar{x} = 4.7)	4 (0.9%)	3 (0.6%)	69 (14.8%)	0 (0.0%)	391 (83.7%)
I have strong, positive feelings for the Albany Pine Bush Preserve. (<i>n</i> =469, \bar{x} = 4.5)	3 (0.6%)	6 (1.3%)	93 (19.8%)	1 (0.2%)	366 (78.0%)
It is important that the Albany Pine Bush Preserve remain a protected preserve. (<i>n</i> =470, \bar{x} = 4.9)	0 (0.0%)	1 (0.2%)	14 (3.0%)	0 (0.0%)	455 (96.8%)
I feel a personal responsibility to support management practices that promote habitat at the Albany Pine Bush preserve. (<i>n</i> =471, \bar{x} = 4.2)	5 (1.1%)	26 (5.5%)	141 (29.9%)	1 (0.2%)	298 (63.3%)
I feel a personal responsibility to support the Albany Pine Bush Preserve. (<i>n</i> =470, \bar{x} = 4.0)	8 (1.7%)	37 (7.9%)	163 (34.7%)	0 (0.0%)	262 (55.7%)

35. How much risk does each of the following pose to the Albany Pine Bush Preserve?

(Check one box for each statement)

Means, percentages, and n's were calculated only for meaningful responses (None-Very High).

	None	Low	Medium	High	Very High	Don't Know
Residential development (<i>n</i> =275, \bar{x} = 3.7)	70 (25.6%)	5 (1.8%)	11 (4.0%)	52 (19.0%)	135 (49.5%)	183 (40.1%)*

	None	Low	Medium	High	Very High	Don't Know
Commercial development (<i>n</i> =215, \bar{x} = 3.5)	63 (29.3%)	3 (1.4%)	11 (5.1%)	31 (14.4%)	107 (49.8%)	240 (52.7%)*
Lack of financial support (<i>n</i> =314, \bar{x} = 3.5)	97 (30.9%)	3 (1.0%)	12 (3.8%)	65 (20.7%)	137 (43.6%)	139 (30.7%)*
Lack of use/visitors (<i>n</i> =394, \bar{x} = 3.2)	105 (26.7%)	15 (3.8%)	76 (19.3%)	107 (27.2%)	90 (22.9%)	64 (14.0%)*
Non-sanctioned use of the preserve (<i>n</i> =345, \bar{x} = 3.0)	137 (39.9%)	2 (0.6%)	31 (9.0%)	71 (20.7%)	102 (29.7%)	114 (24.9%)*
Extinction of rare plants and animals in the preserve (<i>n</i> =284, \bar{x} = 3.3)	95 (34.2%)	2 (0.7%)	17 (6.1%)	63 (22.7%)	101 (36.3%)	179 (39.2%)*

*"Don't know" percentages reflect percentage of all individuals that answered the question.

36. To the best of your knowledge, please indicate whether the following statements are True or False.

- a. The Albany Pine Bush Preserve ecosystem is reliant on frequent disturbances to the land (e.g. fires). (*n*=443)

True **345 (77.9%)** False **98 (22.1%)**
- b. The Albany Pine Bush Preserve only has land in Albany, NY. (*n*=433)

True **276 (63.7%)** False **157 (36.3%)**
- c. New York State Law mandates the protection of the Albany Pine Bush Preserve. (*n*=432)

True **287 (66.4%)** False **145 (33.6%)**
- d. The Albany Pine Bush Preserve is a rare habitat. (*n*=444)

True **426 (95.9%)** False **18 (4.1%)**

- e. The Albany Pine Bush Preserve is nationally recognized. ($n=429$)
 True **364 (84.8%)** False **65 (15.2%)**
- f. The Albany Pine Bush is unique because of its plants and animals. ($n=442$)
 True **423 (95.7%)** False **19 (4.3%)**

37. To the best of your knowledge, what are the goals of the Albany Pine Bush Preserve?
(Check all that apply) (n=453)

- Provide green space (natural area) for public use **331 (65.4%)**
- Protect the Karner Blue Butterfly **406 (89.6%)**
- Protect the ecosystem **405 (89.4%)**
- Educate the public **398 (87.9%)**
- Other _____ **24 (5.3%)**
- I don't know **21 (4.6%)**

38. To the best of your knowledge, what types of practices does the Albany Pine Bush Preserve use to maintain the health of the preserve? *(Check all that apply) (n=453)*

- Removal of non-native trees and plants **315 (69.5%)**
- Cutting trees to create openings in the forest **226 (49.9%)**
- Mowing of small trees and shrubs **203 (44.8%)**
- Controlled burns (low-intensity fire) **377 (83.2%)**
- Closing trails near environmentally sensitive areas **302 (66.7%)**
- I don't know **83 (18.3%)**

PROTECTING NATURE PRESERVES

We would like your opinion on activities that can be done to support nature preserves.

39. In your opinion, how effective do you believe the following are at supporting nature preserves? *(Check one box for each statement)*

	Very Ineffective	Slightly Ineffective	Neither	Slightly Effective	Very Effective
Visiting the nature preserve ($n=350, \bar{x}=4.4$)	4 (1.1%)	4 (1.1%)	19 (5.4%)	130 (37.1%)	193 (55.1%)

	Very Ineffective	Slightly Ineffective	Neither	Slightly Effective	Very Effective
Attending programs at the nature preserve ($n=352$, $\bar{x}=4.4$)	2 (0.6%)	1 (0.3%)	20 (5.7%)	145 (41.2%)	184 (52.3%)
Donating money in support of the nature preserve ($n=350$, $\bar{x}=4.6$)	3 (0.9%)	4 (1.1%)	24 (6.9%)	76 (21.7%)	243 (69.4%)
Volunteering time at the nature preserve ($n=350$, $\bar{x}=4.5$)	2 (0.6%)	3 (0.9%)	29 (8.3%)	106 (30.3%)	210 (60.0%)
Writing letters of support to newspapers, local representatives, or preserve staff ($n=349$, $\bar{x}=4.3$)	7 (1.6%)	5 (1.1%)	30 (6.7%)	163 (36.0%)	244 (54.3%)
Talking positively about the nature preserve ($n=351$, $\bar{x}=4.5$)	4 (1.1%)	3 (0.9%)	18 (5.1%)	122 (34.8%)	204 (58.1%)

40. In the next 12 months how likely are you to do each of the following activities? (Check one box for each statement)

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely Likely
Visit the Albany Pine Bush Preserve ($n=351$, $\bar{x}=4.1$)	19 (5.4%)	21 (6.0%)	38 (10.8%)	113 (32.2%)	160 (45.6%)
Attend an Albany Pine Bush Preserve program ($n=351$, $\bar{x}=3.6$)	23 (6.6%)	41 (11.7%)	89 (25.4%)	112 (31.9%)	86 (24.5%)
Donate money in support of the Albany Pine Bush Preserve ($n=350$, $\bar{x}=3.0$)	37 (10.6%)	79 (22.6%)	119 (34.0%)	88 (25.1%)	27 (7.7%)
Volunteer time at the Albany Pine Bush Preserve ($n=348$, $\bar{x}=2.4$)	66 (19.0%)	138 (39.7%)	89 (25.6%)	36 (10.3%)	19 (5.5%)

	Extremely Unlikely	Unlikely	Neutral	Likely	Extremely Likely
Oppose cutting trees to create openings in the Albany Pine Bush Preserve ($n=345$, $\bar{x}=2.2$)	118 (34.2%)	88 (25.5%)	101 (29.3%)	30 (8.7%)	8 (2.3%)
Oppose the use of controlled burns (low-intensity fires) to promote plant and animal diversity at the Albany Pine Bush Preserve ($n=345$, $\bar{x}=1.7$)	178 (51.6%)	102 (29.6%)	50 (14.5%)	11 (3.2%)	4 (1.2%)
Write letters of support for the Albany Pine Bush Preserve to newspapers, local representatives, or Albany Pine Bush Preserve staff ($n=346$, $\bar{x}=2.4$)	74 (21.4%)	128 (37.0%)	94 (27.2%)	40 (11.6%)	10 (2.9%)
Oppose the mowing of small trees and shrubs at the Albany Pine Bush Preserve ($n=343$, $\bar{x}=2.1$)	124 (36.2%)	93 (27.1%)	102 (29.7%)	18 (5.2%)	6 (1.7%)
Oppose the closure of trails that protect sensitive habitat in the Albany Pine Bush Preserve ($n=342$, $\bar{x}=1.9$)	159 (46.5%)	99 (28.9%)	55 (16.1%)	15 (4.4%)	14 (4.1%)
Oppose the removal of non-native trees and plants to promote plant and animal diversity at the Albany Pine Bush Preserve ($n=343$, $\bar{x}=1.8$)	167 (48.7%)	95 (27.7%)	57 (16.6%)	16 (4.7%)	8 (2.3%)
Talk positively about the Albany Pine Bush Preserve to friends, neighbors, and family members ($n=345$, $\bar{x}=4.3$)	10 (2.9%)	9 (2.6%)	35 (10.1%)	119 (34.5%)	172 (49.9%)

41. How strongly do you agree or disagree with the following statements? (Check one box for each statement)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I am a supporter of the Albany Pine Bush Preserve. ($n=348$, $\bar{x}=4.1$)	6 (1.7%)	8 (2.3%)	67 (19.3%)	144 (41.4%)	123 (35.3%)
I spend a lot of my time in natural settings (woods, ocean, mountains, lake, desert). ($n=346$, $\bar{x}=4.0$)	7 (2.0%)	20 (5.8%)	60 (17.3%)	129 (37.3%)	130 (37.6%)
I think of myself as a part of nature not separate from it. ($n=345$, $\bar{x}=4.2$)	6 (1.7%)	9 (2.6%)	39 (11.3%)	155 (44.9%)	136 (39.4%)
Engaging in environmental behaviors is important to me. ($n=344$, $\bar{x}=4.4$)	1 (0.3%)	5 (1.5%)	33 (9.6%)	139 (40.4%)	166 (48.3%)
If I had enough time and money, I would definitely devote some of it to environmental causes. ($n=346$, $\bar{x}=4.4$)	3 (0.9%)	8 (2.3%)	28 (8.1%)	130 (37.6%)	177 (51.2%)
I would feel that an important part of my life would be missing if I was not able to get out and enjoy nature from time to time. ($n=345$, $\bar{x}=4.7$)	2 (0.6%)	3 (0.9%)	9 (2.6%)	84 (24.3%)	247 (71.6%)
Plants and animals have as much right as humans to exist. ($n=345$, $\bar{x}=4.5$)	9 (2.6%)	6 (1.7%)	21 (6.1%)	92 (26.7%)	217 (62.9%)
I value the existence of endangered species. ($n=345$, $\bar{x}=4.7$)	0 (0.0%)	0 (0.0%)	8 (2.3%)	87 (25.2%)	250 (72.5%)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There is not much that any one individual can do about the environment. (n=343, \bar{x} = 1.8)	135 (39.4%)	155 (45.2%)	32 (9.3%)	16 (4.7%)	5 (1.5%)
The conservation efforts of one person are useless as long as other people refuse to conserve. (n=343, \bar{x} = 2.0)	125 (36.4%)	148 (43.1%)	34 (9.9%)	29 (8.5%)	7 (2.0%)

BACKGROUND INFORMATION

42. Do you consider yourself an environmentalist? (n= 342)

Yes, Definitely **152 (44.4%)** No **35 (10.2%)**

Yes, Somewhat **155 (45.3%)**

29. In what year were you born? n=337 \bar{x} = 1964 $\bar{\sigma}$ = 14.20 Range 1926-1997

30. How long have you lived in New York's Capital District? _____ years

• n=322 \bar{x} = 33.70 years Range: 1-83 years

31. Are you currently a member of the Friends of the Pine Bush? (n=346)

Yes **36 (10.4%)** No **310 (89.6%)**

32. Are you currently a member of Save the Pine Bush? (n=344)

Yes **13 (3.8%)** No **331 (96.2%)**

33. Do you have children? (n=344)

Yes **245 (71.2%)** No **99 (28.8%)**

34. How old are your children? (Check all that apply) (n=142)

0-2 **22 (15.5%)** 10-14 **48 (33.8%)**

3-5 **37 (24.1%)** 15-18 **47 (33.1%)**

6-9 **48 (33.8%)**

Distance from Preserve (*n*=348)

Within 5 miles	Within 10 miles	Out 10 miles
190 (54.6%)	88 (25.3%)	70 (20.1%)

Thank you for your time and effort!

To return this questionnaire, simply seal it with the white removable seal, and drop it in the mail (return postage has been paid).

You can also use the space below to offer any additional comments you would like to make about the Albany Pine Bush Preserve generally