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FOREST AESTHETIC'S ROLE IN SUSTAINABILITY: ASSESSING PRIVATE FOREST LANDOWNERS' PERCEPTIONS IN PENNSYLVANIA

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ABSTRACT

Private forest landowners (PFL) own a significant portion of forestland in the United States and globally. Growing concerns about deforestation, continued population expansion, and an increased demand for forest products, are combining to pressure PFLs to supply a larger proportion of domestic wood products. Forest aesthetics are among one of the non-economic considerations that guide forest landowner behavior and management objectives. Due to a negative association of forest aesthetics following a timber harvest and/or other forest management activity with damage, PFLs are often less likely to actively manage their forestland.

Defining forest sustainability has become a much debated topic between policy makers, resource managers and other stakeholders. The definition of a sustainable forest or sustainable forest management practice (SFM) changes considerably based on an individual's sociodemographics and core beliefs. Adding additional complexity, the concept of sustainability addresses the temporal issue of intergenerational equity. Many agencies and interest groups have defined sustainability, but little consensus has been reached.

Forest aesthetics are a fundamental element of sustainability. Previous research has identified various visual preference themes associated with timber harvesting but little has been done to assess how PFLs associate these features with forest sustainability. This study examines possible linkage between aesthetics and forest sustainability. Through the use of qualitative data analysis, a better understanding of forest landowner motivations is obtained.

Several common themes were derived from PFL responses to photos of forest management activities. In particular, two themes emerged which when taken together may directly affect the willingness of owners to actively manage their forests – a bias against even-aged management activities and a dislike for overstocked. Findings from this study suggest the existence of a barrier between PFL aesthetic preference and perception of sustainability.

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Chapter 1

INTRODUCTION

Of the roughly 747 million acres of forestland in the United States, approximately sixty percent, or 430 million acres, is owned by private forest landowners (PFLs) (NWPWA, 2007). Growing concerns about deforestation, continued population expansion, and an increased demand for forest products, are combining to pressure PFLs to supply a large proportion of domestic wood products (Pennsylvania DCNR, 2008). Concerns about forest aesthetics, a non-economic value that guides PFL behavior and management objectives (Vodak et al., 1985), could impact this supply. There may be a tendency for PFLs to equate logging with damage to the environment especially if they associate degraded aesthetics with harvesting outcomes. Therefore, the role of aesthetics and whether and how they bias opinions towards harvesting in general (Willhite et al., 1973), and even-aged forest management in particular (Ribe, 1989), is an important issue which needs to be addressed.

Along with increased awareness surrounding global climate change and dependency on foreign petroleum products, several countries have begun exploring the use of woody biomass originating from private forests as a feedstock for alternative fuels (Brundtland Commission, 1987). Forest aesthetics after a woody biomass harvest may play an important role in affecting PFL acceptance of these harvesting practices.

Recently, forest science has shifted toward ecosystem management (Bengston, 1994). This shift led to both the emergence of a greater demand for sustainable and certifiable forest products, and more ecologically sustainable forest management practices. In part, it also contributed to a complex debate, one which is at least triangular

- balancing timber supply with ecology and aesthetics (Sheppard, 2001). This debate examines whether sustainable landscapes can be aesthetic and whether aesthetically pleasing landscapes are sustainable (Sheppard, 2001).

Human-landscape perception theory has identified several sources of bias in the formation of an ecological aesthetic framework (Zube et al., 1982). Expert judgments, in the case of visual perception, are often based on art or ecology while non-expert judgments generally rely on psychological perceptions based on landscape stimulus and objective landscape properties (Zube et al., 1982). For example, a non-expert may view large woody debris as detracting from a forest's aesthetic qualities and disruptive of forest health. Given the same conditions, a forest manager most likely would recognize the effects of removing woody biomass as detrimental to forest ecosystem sustainability.

The definition of the term "sustainable" has become the subject of recent debate. The Brundtland Report defines sustainable development as ". . . development which meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987).

For professional resource managers, sustainability is a dynamic and often difficult term to define (Shifley, 2006). The concept may be even more problematic for PFLs. From the latter's perspectives, sustainability might have myriad definitions and values. To better understand the meaning PFLs attach to sustainability and to assess their values, it is necessary to identify and better understand those forest landscape features they consider sustainable. Government agencies, including the USDA Forest Service (USFS), have developed management strategies (e.g., Scenic Beauty Estimation) specifically

dealing with visual resources and the general public's perceptions of these management activities.

Previous research on an ecological aesthetic and social acceptability (Vodak et al 1985, Brunson 1993, 1996, Gobster 2007) has identified public bias toward unprofessional forest management activities such as high-grading (the practice of removing only the largest, highest quality stems and leaving inferior trees, either genotypically or phenotypically) as well as even-aged management. High-grading shows a disregard for the future of the forest and often leaves it in a degraded condition. In response to undesirable practices, many forest landowners have developed a bias against timber harvesting as a whole (Vodak et al., 1985). The public clearly recognizes rutted soils and damaged residual trees as poor management (Vodak et al., 1985). Because of this perception of damage causing activities, many landowners do not actively manage their forest. As a result, they could lose the forest attributes that contribute to sustainability (Willhite et al., 1973).

Various studies have identified general public, forest resource manager, and PFL visual landscape preferences but have done little to understand how these aesthetic features affect the landowner's perception of overall forest sustainability. By definition, certain even-aged silvicultural systems emulate natural disturbances and are generally understood to be sustainable management practices, given the right conditions (Helms, 1998). However, practices that are the most sustainable may not have the most aesthetic quality, and vice versa.

To better understand motivations and perceptions toward aesthetics and sustainability, this study will identify how specific visual features associated with timber

harvesting are perceived by forest landowners as being aesthetically pleasing or otherwise. By assessing those visual features perceived as sustainable, it will be possible to better understand what management activities PFLs would be willing to undertake to meet forest management objectives.

The remainder of this thesis is organized in the following manner. First, a review of the relevant and accessible literature on forest aesthetics and sustainability research is undertaken. This is followed by a description of the study's methodology and data collection techniques and finally a discussion of the emergent themes from this study.

Chapter 2

REVIEW OF LITERATURE

This study seeks to understand how PFLs evaluate forest aesthetics and sustainability. This chapter consists of several sections that illustrate the historical importance of visual preference research and provides fundamental supporting literature on the roots of landscape preference research, stand level visual preference research, private forest landowner centered research, and the connection of aesthetics and sustainability.

In natural resource management, there has been a recent focus on the importance of ecosystem management (Bengston, 1994), taking social equity and temporal scales into consideration. Until recently, forest management was framed around the utilitarian ideal coined by the founder of the Society of American Foresters, Gifford Pinchot. Pinchot's philosophy, "For the greatest good for the greatest number for the longest time," (U.S. Forest Service, 2009) was the guiding principle in natural resource conservation and forest management since the early 1900s. As late as the 1990s the Society of American Foresters stated that, "…timber comes first…" in the description of the hierarchy of societal needs from forests (Bengston, 1994, pg. 516).

A shift from the traditional multiple-use, sustained yield model of modern forest management to the "new forestry" was, in part, an attempt to elevate amenity values above forest commodities. Although not entirely "new" in its methods, this approach pays greater attention to maintaining complex ecosystem functions and not exclusively regenerating trees merely for timber production (Franklin, 1989). An increased interest in the use of woody biomass from privately owned forests as a source of renewable fuels makes the continuation of research on PFL perceptions of critical importance (Austin,

2008). If PFLs are unwilling to accept the visual consequences of harvesting for woody biomass, this would significantly reduce the amount of feedstock available from the landbase (Metcalf and Finley, 2010). A holistic approach to forest resource management appears desirable to meet societal needs but it may also act as a barrier to expanding renewable energy development.

Forestry's progression towards ecosystem management has evolved to address ecological and social issues. In *A Sand County Almanac*, American ecologist and forester Aldo Leopold (1949) wrote about the "conservation aesthetic," describing the non-economic benefits and assets received from natural resource conservation. Leopold wrote, "If the private owner were ecologically minded, he would be proud to be the custodian of a reasonable proportion of such areas (wetlands, woodlots, native prairies, etc.) which add diversity and beauty to his farm..." (Leopold, 1949, p. 249).

Timber harvesting and other forest resource extraction activities hold high potential to visually modify a natural appearing landscape (McCool et al., 1986). Given the highly mechanized nature of most modern forest management activities, timber harvesting can be thought of as large equipment extracting wood products in a relatively fragile natural environment. Using Best Management Practices (BMPs) during harvesting activities reduces impacts but does not negate them (Pennsylvania DCNR, 2008).

Defining aesthetics

Derived from the Greek word *aisthetikos*, meaning "of sense perception," aesthetics is a field of philosophy that studies beauty and preference (Cline, n.d.). In Immanuel Kant's works on teleology and aesthetics, he argues that it is the human faculty of judgment that enables us to experience beauty and view those experiences with

meaning and purpose (Burnham, 2001). According to Kant's theory on aesthetics, there were three types of aesthetic judgments: (1) judgments of the agreeable, (2) judgments of beauty, and (3) judgments of the sublime. He felt that the aesthetic experience was inexplicable without both an intuitive and a conceptual dimension (Burnham, 2001). Kant argued the experience of natural beauty was superior to that in art and it harmonized the best habits of the mind (Carlson, 2010).

Environmental aesthetics, a sub-field of Kant's aesthetic theory, emerged within analytic aesthetics in the latter part of the twentieth century. Prior to the development of environmental aesthetics, the field was primarily concerned with philosophy of art. The environmental movement of the twentieth century created a new appreciation of nature and growing public concern over environmental degradation (Carlson, 2010).

Forest aesthetics have long been considered benign, non-consumptive uses in forest management (Gobster, 1996) and are the primary aspect of human-landscape interaction (Kaplan and Kaplan, 1989). The general public's perception of a visually degraded landscape is often associated with unsound and thereby unsustainable practices (Sheppard and Harshaw, 2001).

Following on the denuded landscapes associated with the end of the 19th century in America, Aldo Leopold suggested that if something looked bad visually, then it was most likely "bad" ecologically (Sheppard and Harshaw, 2001). The latter perspective on forest management has resulted in conflict, as well as lawsuits, between interest groups and resource management agencies, particularly during the clearcutting debates of the 1970s (Bliss, 2000). To minimize liability and account for social needs, public agencies, such as the USFS, were forced to consider the visual effects of forest management.

Foresters and other natural resource managers are stuck between several very different disciplines. The challenge is amplified by the daunting array of theoretical and methodological approaches confronting environmental professionals from the various disciplines specializing in the study of human-environmental perceptions (Lewis, 2006). Links between sustainability and aesthetics are entrenched in forest ecology, environmental psychology, rural sociology, and many other disciplines.

Defining sustainability

The concept of sustainability has become a much debated topic in recent decades. In 1980, the International Union for the Conservation of Nature developed a report focusing on the desire for "sustainable development" or "sustainability," in human activity and economic development. This was the first time when policy makers and resource managers met to discuss future equity and justice in global environmental policy (Holland, 2001).

The Brundtland Report (1987) defined sustainability as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). This report laid the groundwork for the 1992 Rio Summit, the 1997 Kyoto Protocol and the 2002 World Summit on Sustainable Development in Johannesburg. These meetings required countries to create a strategy of sustainable development and led to the establishment of the United Nations Commission on Sustainable Development. However, the Brundtland Report's definition of sustainability confused sustainable growth with sustainable development by ignoring consumptive behaviors (Orr, 2003).

The transition to a sustainable state is less of a hurdle for the technological than it is for social, political and psychological change (Orr, 2003). In his essay, Orr (2003) identified four challenges to sustainability: (1) a lack of measures and models to describe the human endeavor relative to the environment (2) acknowledgment of the need by people and governments of the need for sustainability (3) the need for education about the importance of change; and (4) the need to solve human problems using compassion, wisdom, empathy and love, rather than logic alone (Orr, 2003). In theory, humans have an understanding of what is required to attain a more sustainable state but require the will and desire to reach it.

Environmental justice and intergenerational equity are central themes found among the various definitions of sustainability. The concept of "fair share" use and stewardship of natural resources is grounded in distributive justice theory. Distributive justice essentially advocates the equal allocation of material goods to all members of society (Lamont and Favor, 2007). In its purest form, distributive justice lacks the temporal issue of intergenerational equity as a key component in sustainability.

A dominant concept of sustainability that recognizes the temporal issue raised by intergenerational equity is described as strong sustainability. Strong sustainability focuses on the infinite sustaining of Earth's biological capital (Roemer, 2009). The concepts of intergenerational equity and strong sustainability are particularly important when considering long-lived natural resources such as forests.

Defining the qualities of a "sustainable forest," has been a problematic challenge for forest managers and policy makers. By attempting to define the characteristics of a sustainable forest, forest managers and policy makers are implying the existence of some

universally desirable state of a forest (Romm, 1993). Undertaking such a task is difficult since the qualities of a sustainable forest are dynamic and unique, as are the characteristics of those individuals that define these values.

Policy makers and resource managers have struggled to develop a "working definition" of sustainable forestry. The working definition of sustainable forestry emerges from environmental justice theory (described previously) and can be summarized as people living in one place and time should provide their "fair share" of values. That is, they should neither unfairly exploit nor deprive themselves of certain values to the detriment or benefit of people in another place or time (Oliver, 2003). The definition of sustainable forestry should encompass the ecological, economic, and social benefits forests offer (Jenkins and Smith, 1999). Any attempt to define forest sustainability implies a set of values and priorities.

With language taken from the Brundtland Report (1987), the Society of American Forester's (SAF) "Dictionary of Forestry" defines sustainable forest management (SFM) as:

> "...the practice of meeting forest resource needs and values of the present without compromising the similar capability of future generations...integrating the reforestation, managing, growing, nurturing, and harvesting of trees for useful products with the conservation of soil, air and water quality, wildlife and fish habitat, and aesthetics." (SAF, 2008).

In the case of forest management activities (timber harvesting), this definition is applicable since it addresses resource extraction, conservation and intergenerational issues. Although SAF's definition can be applied to timber harvesting activities, the meaning of sustainability should not be limited by this definition.

Aesthetics and sustainability are highly regarded values of forest landscapes; however, forest management practices may cause conflict with other land use and recreation opportunities (Gobster, 1999). Silviculture, the science, art, and practice of manipulating forest establishment, growth, and composition to meet diverse human needs (Helms, 1998), is itself modeled to emulate natural disturbance regimes and may not be aesthetic. Scenic quality following forest management activities has been viewed as a natural byproduct of a well-managed forest (Ribe, 1989). Through various landscape preference research efforts (Kaplan and Talbot, 1988; Sheppard, 2001; Gobster, 1999), a question arises: Are scenic landscapes ecologically sustainable, and are ecologically sustainable landscapes scenic?

There have been several definitions of sustainability proposed in the literature. For the purposes of this thesis, the working definition of sustainability includes its three fundamental elements: (1) social, (2) ecological, and (3) economic. A sustainable forest management practice is one that benefits the ecology of the forest ecosystem as a whole while equitably maintaining the societal values of the forest, both economic and non-economic, for current and future generations.

Landscape preference

Rachel and Stephen Kaplan's (1989) psychological research into landscape preference noted several predictor variables used in rating various landscape photos. The definitions for these predictor variables are:

- *Coherence*: How well the scene "hangs together;" how easy is it to predict from one portion of the scene to another
- *Complexity*: Extent to which the scene presents many visual elements or promises more information if one had more time to look from the present vantage point

- *Edge*: Presence of distinct borders between zones; legibility through order
- *Mystery*: Extent to which scene promises more information if the viewer could walk deeper into it
- *Naturalness*: Opposite of ornamental; produced by nature
- *Spaciousness*: Visible availability of options for locomotion; how much room one has to wander
- *Trees*: Number, size and dominance in the scene

In addition to these predictor variables, other factors needed to be considered to understand visual perception. When people from different social or cultural backgrounds encounter the same landscape, they often differ in their interpretations and evaluations of the setting (Meinig, 1979). Kaplan and Talbot (1988) identified the role ethnicity played in landscape preference while Balling and Falk (1982) focused on various age groups. Ho et al. (2005) examined the role gender and ethnicity had on outdoor recreation and perceived benefits of park visitation. To define diverse aesthetic qualities of a landscape, an observer's educational background, exposure to human-altered landscapes, and demography all have significant effects on landscape preference.

A lesser understood human dimension of natural resource management is spatial-connectivity or sense of place. Attachment (both emotional and spiritual) to a place has been the source of much debate and research in landscape-perception theory. Along with ethical and cultural differences, sense of place may have a profound effect on perception in regards to forest management (Stedman, 2003).

The National Environmental Policy Act (NEPA) of 1969 and the National Forest Management Act of 1976 both led to requirements for management agencies (particularly the USFS) to consider scenic values in resource planning (McCool et al., 1986). In a

response to NEPA and the controversies surrounding clearcutting on national forests, visual resource management (VRM) became a field of study (Sheppard, 2001).

As a part of VRM, the Scenic Beauty Estimation (SBE) method (Daniel and Boster, 1976) provides quantitative measures of aesthetic preferences for alternative wildland management systems. The SBE method developed by USDA represents an effort to incorporate visual impacts and other social contexts into actively managed landscapes (Schroeder and Daniel, 1981). The SBE score for a particular landscape was derived using panels of observers and is useful for gauging visual impacts such as forest management activities on public lands (Anderson, 1981; Benson et al., 1981; Schroeder et al., 1980). By assigning a score to a particular scene (typically represented as a slide image), a standardized approach for comparing responses across various groups was formulated.

The Visual Management System (VMS) developed by the USFS and other land management agencies seeks to incorporate visual features into management activities by categorizing landscapes into classes, identifying potential visual sensitivity to public viewing, and establishes visual quality objectives (McCool et al., 1986). The five primary visual quality objectives of VMS include:

- *Preservation*: Only ecologically induced changes in the landscape are allowed
- *Retention*: Management activities are not visually evident
- *Partial Retention*: Management activities remain visually subordinate to natural appearing landscape
- *Modification*: The effects of management activities in the fore- and middle-ground dominate the view but appear natural

- *Maximum modification*: Management activities appear dominant in the fore- and middle-ground areas but appear natural when viewed as background

The USFS Scenery Management System (SMS) establishes guidelines for protecting unique scenic and ecological qualities as well as integrating scenic aesthetics into management activities on national forests (Gobster, 1999). Published in the mid-1990s, SMS categorizes areas into scenic classes using relative importance. Areas of high public use and travel are of extremely high importance while those areas in the backcountry wilderness are of moderate importance. Visual mitigation practices such as screening, edge shaping, or siting are commonly used to reduce the impacts of harvest activities that might not meet expectations for a naturally appearing forest environment (Gobster, 1999).

Landscape scale visual preference research

In the 1970s and 1980s, landscape preference research focused on landscape scale variables and was generally concerned with public, resource professional, and interest group opinions (Anderson, 1981; McCool et al., 1986). While studying the acceptance of ecosystem management, Zube et al. (1982) and Brunson et al. (1996) concluded that judgments of scenic quality have both a cognitive and affective influence on the manner in which individuals evaluate their environment. This supported Leopold's belief that activities that may be ecologically sound look displeasing to the untrained eye.

Clearcutting has become a focus of much interest in landscape scale visual preference. In a phone survey, Bliss (2000) assessed public perceptions and acceptance of forest management, finding no significant difference between public and forest landowner opinions . Through his research, Bliss identifed several negative social factors

associated with clearcutting (and forestry in general). These negative associations generally focused on deforestation as a function of environmental degradation, loss of naturalness, and resource overexploitation.

Public lands visual preference research

To this point in visual preference research, the public had been concerned with scenes at a larger landscape levels. With the development of the SBE method, the primary focus with the general public on landscape preference shifted towards perceptions of stand level management activities. In Hoffman and Palmer's (1996) synthesis of visual preference research, stand characteristic variables such as species composition, forest type, tree density, tree size (diameter), forest edge shape, amount of slash or downed woody debris, time since harvest, herbaceous ground cover, silvicultural system selection, and perceived naturalness were among the most commonly tested variables.

The emergent trend in early visual preference research illustrated a preference for stands that had been silviculturally treated over natural appearing stands (McCool, et al., 1986). Rutherford and Shafer (1969), working in New York's Adirondack Mountains, concluded unmanaged stands were less desirable than stands that had been selectively thinned.

Tree size and understory vegetation establishment has both positive and negative impacts on scenic beauty values. With understory structure as a function of scenic beauty, Palmer and Sena (1993) and Ribe (1990) reported that as the understory became more established in hardwood forests, aesthetic values decreased. Large, mature tree retention had an opposite effect, resulting in higher scenic values. Ribe (2002), by performing

public mail surveys, concluded that the presence of large trees raised aesthetic preferences (i.e., Scenic Beauty Estimation) in stands with varying green tree retention. Along with his work concerning understory species and woody debris, Ribe (1990) also found that tree species composition played a role in visual preference. Specific species were favored as more “fitting” for certain settings (Ribe, 1990).

Temporal differences (time after harvest) on the scenic beauty score of timber harvesting have been the focus of several studies (Benson and Ullrich, 1981; Hull and Buhyoff, 1986; Palmer, 1990). The effects of time and the associated “greening-up” following a timber harvest improved overall visual impact scoring. A non-linear relationship between time since harvest and scenic value exists, as scenic values immediately following the harvest were low and then increased with time until the sapling stage in stand development was achieved, then it decreased again (Palmer, 1990).

The impact of silvicultural prescriptions on visual preference has been well documented, especially in the context of clearcutting (Kearney, 2001; Bliss, 2000; Gobster, 1996; Ribe, 1989). These studies found fairly consistant negative perceptions of clearcutting by the general public. In concurrence with these research findings, Ribe (1989) found that visual acceptance of even-aged stands improved as stand age increased and that clearcuts were preferred the least out of traditional even-aged silviculture prescriptions.

The participant’s background has been an important factor in predicting responses. Willhite and Sise (1974) found that foresters and non-foresters had opposing views on issues associated with harvesting practices Hoffman and Palmer (1996) found foresters were more accepting of the aesthetic impacts of timber harvesting. In a study

focused on perception of clearcutting, Bliss (2000) found that only 14 percent of respondents believed clearcutting should be allowed on publicly owned land while nearly half said it should be allowed on privately owned land. Along with the differences between forestry professionals and the general public, a clear bias towards using clearcutting materialized among the general public.

Research on preference between even-aged and uneven-aged management (Ribe, 1989; Vodak et al., 1985) found uneven-aged stands were more desirable than even-aged. Vodak et al. (1985) found that as the percentage of trees removed increased (expressed as an estimated percent coverage), unsurprisingly, the public's scenic value rating decreased. However, these studies did show that the large trees and visual penetration of a mature even-aged stand, left for some time, is more desirable than that of similar uneven-aged forests.

Various public surveys and slideshow presentation-based studies have shown perceived naturalness to directly affect visual preference (Magill, 1994; Kaplan and Kaplan, 1989; Fenton, 1985). The pursuit of naturalness sets unmanaged, "natural" conditions as a baseline for perceived appropriate retention levels (Sheppard, 2001). It is important to note, that the term "natural" is often directly correlated with actions deemed morally right (Williams, 2002). When describing a scene as "natural," it was implied these conditions were the optimium successional result.

Of those visual factors identified as impacting aesthetic quality, the most salient was slash and downed woody debris following a timber harvest. Slash following a timber harvest is consistently associated with a negative impact (Hoffman and Palmer, 1996). Nyland et al. (1976) showed the height to which tops were lopped during a harvest had a

direct impact on responses among viewers. Vodak et al. (1985) and Shroeder et al. (1993) found slash retention and size had similar negative connotations. This aspect of timber harvesting defines an important measure of social acceptability especially when considering the expansion of woody biomass markets.

Understanding public perception has its merits but it is most applicable on publicly owned lands. A need for research focused on PFLs became apparent during the timber shortage scares of the late 1970s and early 1980s (Nyland, 1992). Given the amount of land held by PFLs and the increased unavailability of timber from federal lands, attention began to shift toward PFLs (Oregon SAF, 2007).

PFL preference research

Through various research efforts and landowner surveys, we have a better understanding of the reasons PFLs own their forestlands (Bulter et al., 2005; Birch and Pywell, 1986; Turner et al., 1977). A section of the 2004 National Woodland Owner Survey (NWOS) published by the USDA Forest Service (McWilliams et al., 2007) focused on identifying various reasons private forest landowners give for owning their forestland. Among the ten most common reasons for owning woodlands, respondents chose aesthetics as the most important, followed by privacy, family legacy, and protection of nature (McWilliams et al., 2007)

Due to the wide diversity of educational background, age groups, and motivations for owning forestland, PFLs have been the subject of numerous human-landscape interaction studies (McCool et al., 1986; Vodak et al.; 1985, Arthur, 1977). These studies focused primarily on broader landscape scale variables such as stand-level tree retention and were often viewed from a distance through photo presentations. Although important

to understanding public landscape perception, PFL responses to photos of stand-level management resulted in common preference themes. Common responses often focused on the amount of dead and downed woody debris and of live tree retention percentage.

In a study with Massachusetts forest landowners, Brush (1979) found that three of the four lowest ranked sites out of the twenty used in his study, were characterized by small stems and low visual penetration. In this same study, Brush found that those stands with a greater number of larger residual trees received higher visual beauty ratings. Further, clearcut and heavily thinned stands were also rated poorly in various forest landowner studies (Vodak et al., 1985; Langaneu et al., 1977). Clearcuts and heavily thinned stands received low visual quality ratings when compared to lightly thinned, improvement harvests (Vodak et al., 1985).

As with earlier public perception studies, several forest landowner studies (Rader and Hamilton, n.d.; Langenau et al., 1977) showed a general distaste for slash and downed woody debris following a timber harvest. Seventy-five percent of forest landowners rated slash as unpleasant; however, if the resulting debris was gathered and piled, preference scores improved (Rader and Hamilton, n.d.). In general, scenic impact of managed stands improved if woody debris was removed from the stand and more trees were retained (Brunson and Reiter, 1996).

Information pertaining to ecological benefits has a role in aesthetic preference. Although forest landowners may be more accustomed to viewing forest management practices, there appears to be a similarity between general public and PFL ratings when information about the practice was provided. Several studies have shown discrepancies between respondent perception and availability of background information pertaining to

the harvest (Anderson, 1981; Vodak et al., 1985). In general, when participants were given more background information on the harvest and post-harvest recovery efforts, they rated the scenic beauty higher. In addition, individuals who had a favorable attitude toward timber harvesting rated scenes higher than members of environmental interest groups (McCool et al., 1986).

Along with additional information revolving around the pre- and post-harvest conditions, past research also focused on the use of particular technical terms while assessing visual preference. The use of terms such as “clearcutting,” “high-grading,” and “thinning” may have negative connotations. PFLs may associate these terms with environmental degradation (Vodak et al., 1985).

With the importance of aesthetics being recognized in private forests, the next challenge was to manage forestlands for both timber revenue and aesthetics. A function of the SBE method was characterized by the Multiple-Attribute Decision Theory (MDT). Viewed as a mixed-methods approach to resolving conflicting objectives, MDT was used to address PFLs lack of knowledge relative to forest management alternatives (Hyberg, 1987). Using this theory, forest managers posed the question to the landowner to determine the point where they were willing to sacrifice aesthetic quality for financial gain. Hyberg (1987) concluded MDT could be used to systematically define PFL objectives and tradeoffs to achieve forest management objectives.

The body of work covered thus far provides an understanding of visual preferences. However, the relationship between these aesthetic preferences and how they translated into forest ecology have not been explicit.

Linking sustainability and aesthetics

Traditionally, conflict between the public and forest managers focused on disagreement between timber production and forest aesthetics. The movement towards ecosystem management made this conflict much more complex and far less understood (Sheppard, 2001). In figure 2.2, the triangle depicts conflict associated with timber harvesting. The relationships between timber and ecology and timber and aesthetics have been studied. The first represents the study of forestry and the latter the literature previously reviewed in this chapter. The link, shown with the dotted arrow in figure 2.2, between ecology and aesthetics, is poorly understood.

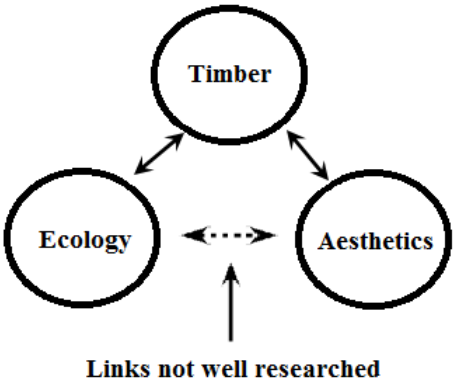

Figure 2.2: Diagram of contemporary natural resources conflict (Sheppard 2001)

In this relationship, Sheppard equates ecology with sustainability. Ecology is an element of sustainability, as defined in earlier sections. By directly associating ecology and sustainability, the scope of the definition is greatly generalized. Shown in figure 2.2a, the linkage between timber, aesthetics and sustainability better represents the questions addressed in this study.

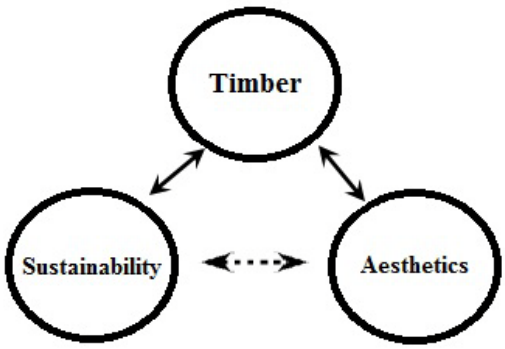

Figure 2.2a: Diagram of the hypothetical relationships between timber, aesthetics and sustainability

To further understand the theories that postulated a relationship between sustainability and aesthetics, I describe four main theoretical foundations. While attempting to link sustainability and aesthetics, these theories have become guiding principles in various visual resource management programs such as the SMS developed by the USFS (Sheppard, 2001). The four main theories are:

- *Conservation (land) aesthetic* – (Leopold, 1949)
- *Scenic aesthetic* – VRM principles (Gobster, 1999)
- *Ecological aesthetic* – "new forestry" principles (Gobster, 1999)
- *Visible stewardship* – (Sheppard, 2001)

It may appear inappropriate for a scientist or natural resource manager to use ethical arguments to describe a scientific theory (Leopold, 2004). Leopold's conservation aesthetic stated simply is a need for "limitation on freedom of action in the struggle for existence" (Leopold, 1949, p. 202). By recognizing the intrinsic values of nature, Leopold's conservation aesthetic helped pave the way for additional theories linking aesthetic quality and sustainability.

Figure 2.3 depicts the hypothetical relationship between the balances of forest aesthetics and sustainability. As illustrated by the figure, when visual quality rating is high, the sustainability of the activity rates low. For example, a park-like setting would possess high visual quality for the public but the lack of regeneration would be considered undesirable by ecologists. To have positive utility in both the public's and forest manager's acceptance of a forest management activity, we must understand where the tipping-point between the two occurs.

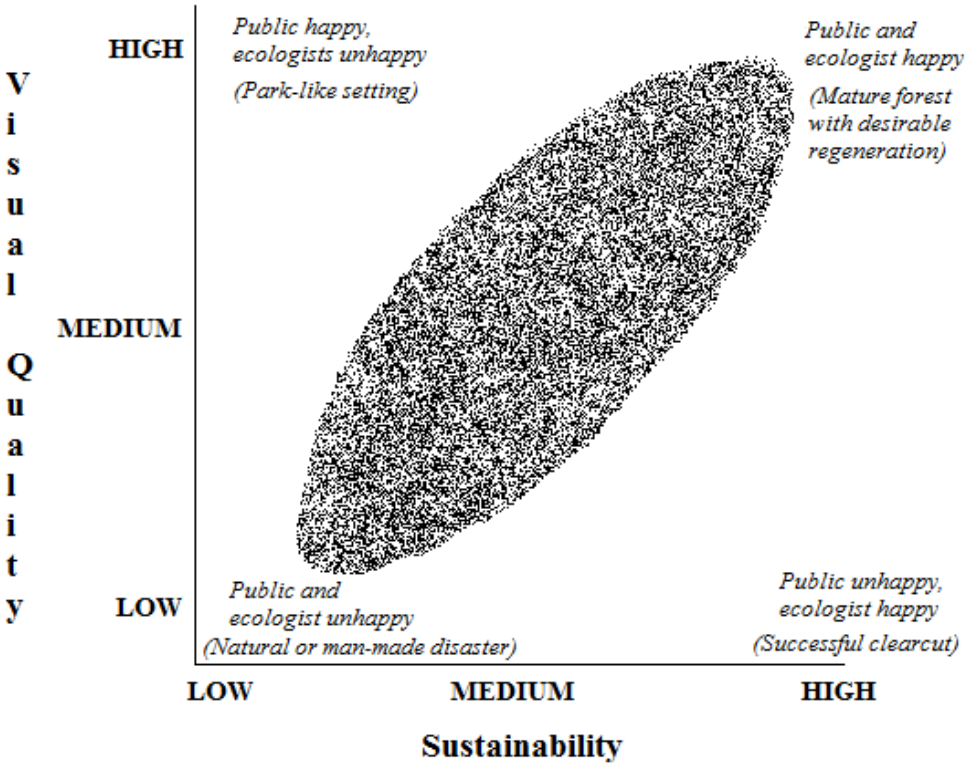

Figure 2.3: Hypothetical relationships between ecological sustainability and aesthetics: contrasts in public and ecologists' viewpoints (Sheppard, 2001)

The scenic aesthetic (Gobster 1999) developed through the combined efforts of landscape architects, foresters, and VRM professionals in the USDA Forest Service, generally fits well with prevailing public perceptions of landscape (Sheppard, 2001). Studies into the scenic aesthetic (e.g., Zube et al., 1982; Kaplan et al., 1998) have shown

that with greater visual impact on the landscape the level of public acceptance decreased accordingly. Management responses to this concept were visual buffers and siting which allowed for less impact on visually sensitive sites. To avoid conflict over aesthetics, forest management activities were merely hidden from the view of the public creating the appearance of untouched nature (Gobster, 1999).

Gobster (1999) concluded that adopting an ecological aesthetic would merge biological and ecological concepts of sustainability with aesthetic appreciation. His ecological aesthetic proposed that if the viewer was more informed by the quantitative benefits of the management activity, resource managers would no longer be required to preserve the visual intactness of the scenic landscape (Sheppard, 2001). The ecological aesthetic seems to push aside the importance of cultural, emotional and spiritual influences as well as motivations. It is much easier for the public to accept the impacts of a natural disturbance than those caused by resource exploitation (Sheppard, 2001).

Visible stewardship, a VRM concept proposed by Sheppard (2001), built on the theory of the ecological aesthetic by incorporating emotional, cultural, and spiritual attachment attributes to forest management activities. This theory focused less on whether a landscape appears natural and more on how the landscape looks cared for (Sheppard, 2001). He concluded that the theory should combine ecological sustainable landscape aspects in the ecological aesthetic while eliciting the acceptance of the scenic aesthetic.

Summary

After reviewing the existing literature on visual preference research, several areas for continued study have been identified including those involving privately owned

forests. Along with identifying new areas of possible study, the literature also resulted in many applicable theories, such as Hyberg's (1987) Multiple-Attribute Decision Theory and Sheppard's (2001) Visual Stewardship Theory, which could be applied in understanding the PFL's perceptions of forest sustainability.

This supporting literature illustrates both important variables in visual resource management and various theories for applying the knowledge of aesthetic preference to resource management. Further complexity is added to this debate given the dynamic structure of forests as well as the ambiguous meaning of sustainability. In addition, the highly variable effects of culture, sociodemographics and beliefs of private landowner perception in aesthetic research makes a "one-size fits all" solution improbable.

Previous research has provided us with insight into trends in visual preference but has done little to explore the association between aesthetics and sustainability. The factors that affect PFL visual preference in relationship to perception of forest sustainability are necessary to understand. To explore the aesthetic theories and possible linkages with forest sustainability, a study was developed to assess these variables. The methodology of this study is discussed in detail in the next chapter.

Chapter 3

METHODS

In this chapter, I outline the methodology and procedures used for obtaining PFLs input for this thesis. As indicated earlier, there is much empirical evidence concerning visual preference and perception.

An emerging trend in sociological research is the use of qualitative data (e.g., focus groups and facilitated group dialogue) to review the dynamics of social systems (Elmendorf and Luloff, 2001). This study explores the experiences and general core beliefs of PFLs surrounding forest management and sustainability. A qualitative approach was chosen to reduce initial costs, to support and compare with existing quantitative data collected in previous aesthetic preference research, and to better understand PFL attitudes, values and behaviors in a local social context (Elmendorf and Luloff, 2001).

Data were collected following a grounded theory approach developed by Glaser and Strauss (1980) in order to capture the rich and varied opinions of the diverse participants. Grounded theory (GT) uses theory emergence rather than hypothesis testing (Dick, 2005). In comparison to hypothesis testing in traditional quantitative methodology, GT uses observation and attention to emerging themes during the data collection phase of a research project to develop a hypothesis.

Grounded theorists share a conviction with many other qualitative researchers that the usual canons of “good science” should be retained, but require redefinition to fit the realities of qualitative research and the complexities of social phenomena (Corbin and Strauss, 1990, pg. 4). A grounded theoretical approach is best suited for the study of complex and dynamic social context and the subtle differences produced by different

sociodemographics variables such as gender, education and race (Lincoln and Denzin, 2000). GT was selected for this study given the diverse nature of PFLs and their beliefs.

There is some skepticism surrounding the use of qualitative research approaches such as facilitated group discussions. These concerns generally focus around representativeness, generalizability, sample size, and the fact that they do not accommodate tests of statistical significance (Elmendorf and Luloff, 2001). This being said, the use of these techniques is an attempt to recognize the benefits of "deep knowledge" gained through qualitative research (Elmendorf and Luloff, 2001) rather than depending on interpretation of statistical data. Qualitative studies emphasize the qualities of the entities and on processes and meanings that are not experimentally examined or measured in terms of quantity, amount, intensity, or frequency (Lincoln and Denzin, 2000). This study assessed: (1) the visual features PFLs found aesthetically pleasing following a timber harvest or other forest management activity; and (2) PFL perceptions of the visual feature's effect on the functioning of the featured forest system (sustainability).

PFL meetings

Four facilitated group discussions were conducted in Pennsylvania (Blair, Huntingdon, Clarion and Mifflin Counties). Earlier research discussed in Chapter 2 focused on the general public's landscape preference and perceptions. In Pennsylvania, forests are predominantly owned by PFLs. Given the role private forestlands have in the future of the forest products industry, PFLs were the primary group of interest in this study. To collect the data, PFLs from county Woodland Owner Association membership databases were mailed invitations to participate in the group discussions.

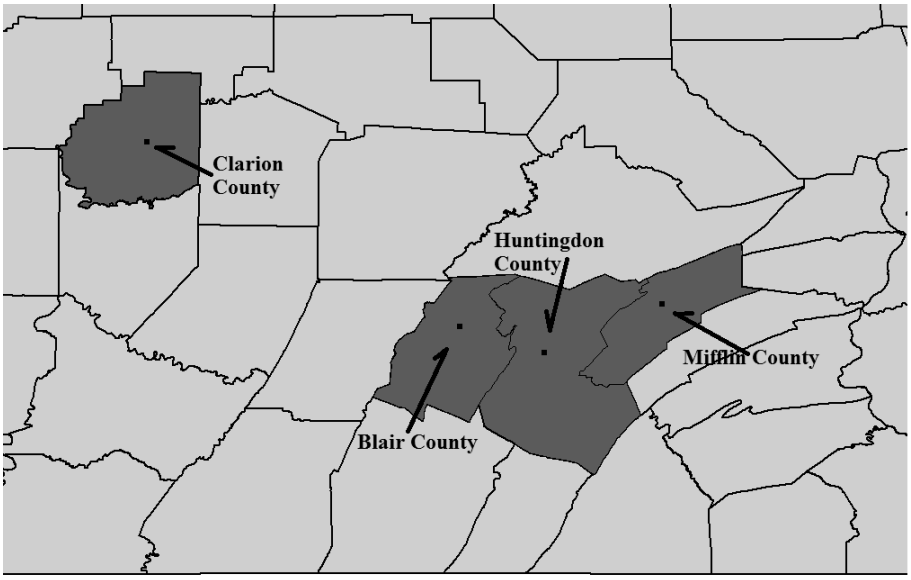

Figure 3.1: Locations of PFL meetings

The facilitated group discussions were held in Pennsylvania to reduce travel costs for facilitators and for the perceived ease of identifying, contacting, and engaging participants (Table 3.1). Due to funding constraints, counties were selected for their proximity to the Pennsylvania State University. The counties that were in an acceptable travel distance (within 100 miles) of the University were also selected based on the presence of an active forest products industry. Counties with large urban areas were not considered for this study due to landowner dynamics, lack of forest industry, and distance considerations.

Selecting counties located in central Pennsylvania was the logical choice for this study (Table 3.1). In addition to their proximity to the University, the selected counties have a significant portion of forests owned by PFLs and considerable portion of the population employed by the forest products industry (PFPA, 2002). The number of individuals employed in the forestry and wood products industry was 526 individuals for

Huntingdon County, 1,063 in Mifflin County, 1,879 in Blair County, and 1,979 in Clarion County as of 2009 (Jacobson, 2009).

Accurate county-wide data on private forest ownership is difficult to find. These data are collected by the U.S. Forest Service's Forest Inventory and Analysis (FIA) database program and the National Woodlands Owner Survey (NWOS). Both programs are survey based and comparisons between findings are not consistent (Metcalf and Finley, 2010). Although ownership data was important in selecting counties for this study, participant interest was the key factor.

Table 3.1: Total forestland and private ownership by county

County	Total forestland (acres)	Privately owned forests (acres)
Blair	200,243	128,155
Clarion	251,616	221,422
Huntingdon	409,216	282,359
Mifflin	166,409	79,876

Source - 2004 FIA database and Penn State Natural Resources Extension Office (Jacobson, 2009)

Initial attempts to solicit participants were difficult. Scheduling conflicts and a general lack of interest were the main difficulties in arranging sessions. A preliminary bulk invitation mailing was conducted using known landowner databases in Juniata, Centre and Huntingdon counties; it generated few responses. In most instances, the meeting was cancelled due to lack of interest. In one case, a Pennsylvania DCNR service forester was contacted for assistance in generating interest in the meetings. That forester provided a list of potential candidates but initial contact and solicitation of interested participants proved difficult. As a result, this effort did little to further the study.

In response, county woodlands owner associations (WOA) were contacted to solicit participants. These associations are known for providing educational materials and workshops to their members about many things, including sustainable forest management. By contacting these associations, we believed it would be more likely that interested PFLs would be contacted. Invitation letters were sent to the members list of WOAs that met study requirements. Following initial interest, follow-up phone calls were made to confirm meeting dates.

Meetings were held at local area restaurants or a convenient location where the participants were provided a meal as a token of appreciation for attending the group discussion. Locations centrally located in the county of interest were selected to minimize travel for participants. I made certain the restaurant had a private meeting room in which to hold the group discussion so as to avoid problems of nonparticipant noise and commotion.

Prior to formally beginning the meetings, the meeting room was organized so that all participants were able to view the projection screen and each other. Tables and seating were typically arranged in a U-shaped configuration to allow for viewing photos and to help encourage conversation among participants.

Two facilitators were present at three group meetings; there was only one at the Mifflin County meeting. The primary facilitator ran the projector from the front of the room and was the individual who initiated the discussion. During the presentation, the primary facilitator was responsible for asking the participants to comment on the photos as they were being presented (Appendix A). Both facilitators used a script of basic questions to keep the discussions flowing; probes to get more detailed responses.

Before beginning the photo presentation, participants were asked to introduce themselves and talk about their experience with timber harvesting and general background (education, description of property and work history). To lighten the mood of the meeting, all participants were asked what they had given up in their personal time to participate in the meeting. During this time, all participants were asked to read and sign an informed consent form, giving the facilitators permission to collect personal information and responses using audio recordings (Appendix D).

Once the introductory stage of the presentation was concluded, participants were shown ten projected images depicting various forest management and timber harvesting activities one at a time (Appendix B). Given a few moments to observe and reflect on the photo (Table 3.2), they were first asked to discuss what they found aesthetically pleasing or disagreeable, as well as the reasons for this perception. During this time, the facilitators encouraged participants to discuss their visual preferences with each other.

After the initial responses, probes were typically asked by the facilitators to clarify responses. For example, if a participant responded, “I don’t like the brush,” the facilitator would ask, “Can you tell us what you don’t like about the brush?” Often a few participants dominated the discussion; at such times the facilitators attempted to bring all of the others participating in the meeting into the discussion.

To analyze the sustainability aspects of this research, the same photos used in assessing aesthetic preference were used. To gauge their perceptions of sustainability, participants were asked to comment on the sustainability of the depicted stand. PFLs were asked to describe whether the previously identified aesthetic feature added to or detracted from the sustainability of the forest depicted in the image. Again, the

Table 3.2: Photo descriptions and relative sustainability
(*Based on criteria for "Sustainable Forest Management" – SAF, 2008 and the working definition of sustainability discussed in Chapter 2)**

Photo no.	Stand description	Relative sustainability***
1	(CONTROL) Mature oak-hickory stand prior to harvesting activity. Well stocked oak spp. overstory with good form. Nearly closed canopy. Low to moderate regeneration in the understory. Low volume of coarse woody debris.	Moderate to High
2	Mature oak-hickory stand following a partial thinning. Light logging slash and coarse woody debris in the understory. Some skidder caused ground disturbance.	Moderate
3	Hardwood clearcut / overstory removal with no residual trees. Heavy coarse woody debris. Moderate regeneration rates.	Moderate
4	Previously thinned hardwood stand. Residual stand has fairly good form. Some coarse woody debris and snags. Spotty advanced regeneration (sugar maple) but overall low regeneration rates. Potential interfering vegetation (fern).	Moderate to Low
5	Previously thinned stand following a second thinning. Residual stand small sawtimber / pole-sized with good form. Good regeneration (oak spp.). Moderate amount of coarse woody debris	Moderate to High
6	Previously thinned stand following several high-grades. Residual stand of poor form and vigor (primarily American beech). Some snags and coarse woody debris.	Low
7	Overstocked, mixed hardwood stand. Low presence of interfering vegetation (ground pine). Heavy midstory with poor form. Some snags and coarse woody debris.	Moderate to High
8	Overstocked, mixed hardwood stand following a shelterwood harvest. Acceptable amount of slash for this type of operation. Small amount of ground disturbance.	Moderate to High
9	Mixed hardwood stand following a diameter limit harvest. Heavy coarse woody debris and slash. Low quality / poor form residual trees	Low
10	Mixed hardwood stand following a woody biomass harvest. All coarse woody debris has been removed. Park-like understory.	Low to Moderate

facilitators asked probes to clarify responses about a feature's sustainability. In this instance, if a participant responded, "I think the lack of small trees makes this unsustainable," the facilitator would follow up with a response such as, "What about the lack of small trees makes this photo unsustainable?"

To minimize bias associated with commonly recognized terms (e.g., high-grading, clearcutting, diameter limit cutting), the facilitators provided little information to the participants about the nature, history, and conditions featured in the photos. In addition, it is important to note that neither the term ‘sustainability’ nor ‘aesthetics’ were defined by the facilitators; both had to be self-defined by the individual.

With the meal and photo presentation, the group meetings lasted approximately 2 – 3 hours. There were several occasions when individuals were highly interested in sharing their opinions and, as a result, this increased the duration of the meeting. Overall, the facilitators gave the participants freedom to speak as much as they liked while maintaining the discussion flow.

Following the group discussions, audio recordings of each meeting were transcribed and analyzed. Content analysis using word frequency was the primary method of data analysis. This technique is commonly used in social science and qualitative research and is a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding (Stemler, 2001). As with other qualitative research procedures, content analysis is used to provide a richer understanding of phenomena.

Content analysis has both advantages and disadvantages. Of its advantages, content analysis is an unobtrusive means of analyzing human social interactions through looking directly at communication in transcripts (Palmquist, n.d.). However, this method can be extremely time consuming and can be subject to increased error due to the coder’s interpretation of responses (Palmquist, n.d.). As with grounded theory, reliability,

validity, generalizability, and replicability are all important considerations when using content analysis (Neuendorf, 2002).

Qualitative content analysis is one of many commonly used methods for reviewing text data. In content analysis, the researcher repeatedly reads the data to gain immersion and then reads the data word for word to derive codes by highlighting key codes and concepts (Hsieh and Shannon, 2005). In this study, the individual photos served to cluster PFL responses and simplified coding.

While reviewing and analyzing PFL responses, notes were taken and coded to identify common responses and themes that emerged. A computer-based word frequency search was used to identify words of potential interest. Although themes were emergent, commonly associated words (e.g., green, clearcut, sapling) were used during the content analysis. Since the context of the words was critical to the study, once interest words were identified, the responses were then read again in their entirety.

The individual photos served as a topic cluster during the coding phase of the data analysis. Common words and phrases were highlighted within each topic cluster. For example, the photos depicting even-aged management were grouped together to analyze the bias related to this management strategy. Following the coding phase of analysis, common themes were synthesized.

Summary

Prior to collecting data, counties were selected by a predetermined set of criteria (proximity, presence of forest industry, and presence of Woodland Owner Associations). Once the locations of interest were selected, participants were then solicited from Woodlands Owners Associations through a mailed invitation letter. After some initial

difficulties, interested participants were identified and then invited to meet and discuss visual preference.

The role of the discussion facilitator was to encourage participants communicate their visual preferences through interaction with one another. In addition, the facilitators teased out particular information without steering the participant's response.

Data collection and analysis was performed in a dynamic, adaptive manner as dictated by grounded theory. By collecting and analyzing data in this manner, a rich understanding of PFL perception was gained. Problems and limitations, such as solicitation of interested participants and budget constraints, emerged during the various stages of the research design but were eventually overcome and addressed.

Transcripts of the content of the group discussions were developed and analyzed to identify common themes. The analysis of the data collected and detail description of the groups are discussed further in the next chapter.

Chapter 4

ANALYSIS OF DATA

This chapter presents the results of the four facilitated group discussions. Following the analysis of group discussion transcripts, common themes and participant responses are reviewed across the four sessions. Content analysis through word frequency was used to identify and assess the commonality of themes.

As described in the previous chapter, facilitated discussion group participants were shown ten projected images depicting various forest management activities involving even-aged and uneven-aged silvicultural treatments (Table 3.2). The participants were not given any additional information concerning species composition, reason for harvesting or other key information regarding the treatment featured in the photograph.

Group composition

PFLs from county woodlands owner associations were asked to provide basic demographic data concerning their age, amount of forested acreage owned and were also asked to describe their personal experience with timber harvesting. Before starting the photo presentation, the participants were given an informed consent form along with a few questions about personal information.

For the sample population, the mean age for participants was 62.1 years. The mean age of the participants in this study falls within the average for PFLs (55-64 years) surveyed in Pennsylvania (McWilliams et al., 2004). The average amount of wooded acreage owned was 137 acres (1500 acres maximum and one participant was a board member in a hunting club but did not personally own acreage). This acreage represents a higher than the average acreage owned (64% of owners in Pennsylvania hold fewer than

10 acres) according to the 2004 Pennsylvania Woodland Owner Survey (McWilliams et al., 2004).

Table 4.1: Group composition

Location of meeting	Date of meeting	Number of participants	Mean age (yrs.)	Male - Female ratio
Blair County	6/15/2010	12	56.7	3:1
Clarion County	6/17/2010	7	61.0	3:4
Mifflin County	6/22/2010	10	72.8	4:1
Huntingdon County	6/30/2010	3	61.3	2:1

The groups were very dynamic and the members reflected numerous work and educational backgrounds. Most participants had a high school level of education, seven had bachelor's degrees and five had graduate degrees. Participants ranged in work experience from family farmers, to high school teachers, and one osteopathic physician. All participants in the meetings were Caucasian and most meetings were male dominated except for Clarion County.

In addition to sociodemographics data, all participants were asked to describe their personal exposure to timber harvesting. Several PFLs indicated having sold timber themselves as owners, conducted timber stand improvement (TSI) operations and had a timber sale with the services of a consulting forester. Background information was gathered at the same time as the informed consent form was handed out.

Group size differed for each meeting and played a role in the participation levels among participants. With larger groups such as those in Mifflin County and Blair County,

participants appeared reluctant to contribute to the discussion. There were several occasions when the facilitators politely asked timid participants to offer their opinion on a photo. On the other hand, the smallest group, Huntingdon County, provided an environment where participants equally and readily shared their opinions. The small group size in Huntingdon County was attributed to a miscommunication in meeting date and therefore, several participants did not show up on the scheduled date.

Each meeting presented its own unique challenges. Overall, all participants were given an equal opportunity to share their opinions. As with many dynamic groups, certain participants dominated the discussion, which was less of a problem with the smaller groups.

Photo presentation responses

Image 1

The first photo served as the control for the experiment. This photo features a mature, undisturbed oak-hickory stand with nearly closed canopy. Reactions to this photo were fairly consistent across all groups with overall pleasing perception of the features in the image. Most of the negative responses about aesthetics were concerned with a desire to see more understory species and regeneration. Another common theme was the need for a more “natural” looking setting. Several participants commented on the naturalness of the photo:

> ***I like it from an aesthetic standpoint of a state park, a park-like setting. It’s a bit too pristine. You don’t see any brush piles or snags.***

Although I can't tell species from here, there is a uniformity here that isn't sitting well with me. They're all straight and look like they could all be the same species. I don't see any conifers or twisted snags. I prefer a diverse landscape and I don't see that here.

I would really like to see some old trees that connect me and my land to the past. This looks used.

I don't know if there's anything I don't like but just the fact that there aren't any different trees. They all look pretty much the same age. They're boring. There's nothing breaking it up. It's too planned, too uniform. It doesn't look wild enough.

On a whole, the participants believed this stand was sustainable but there was a shared concern for the lack of advanced regeneration and the closeness of mature trees. Several participants recognized these stocking traits as detrimental to seedling production and overall forest sustainability.

Image 2

The second photo in the series was a light thinning in a mature hardwood stand with an open field in the background. Some slash and stumps are visible in the photo as well as a small amount of ground disturbance from skidding / forwarding activities. There was some disagreement about aesthetics among participants, particularly in the Clarion County meeting. One participant from Clarion County described the disturbance in this photo by remarking, "It looks like a bomb went off." Other responses focused on the absence of damage to the residual stand from logging equipment, the size of the residual trees, the species composition and the amount of downed woody debris. Asked if having

the knowledge that this stand was recently harvested would affect their aesthetic rating, a participant in the Huntingdon County meeting responded:

> ***You can't have lumber unless you ruin some of the aesthetics. This is a necessary evil, I think. A renewable forest is as pretty as a mature forest in my estimation. The only way you get the forest renewing itself is from fire or a timber cut.***

Several respondents reflected on the residual stand species composition. During the Blair County meeting, after these responses, the facilitator asked if this was a function of aesthetics or of sustainability. Most participants were in agreement that the presence of certain species, typically those of higher economic value (e.g., black cherry, red oak) would change their aesthetic rating for the image.

The rating of sustainability for this partial thinning was fairly consistent. Most responses focused on tree size and species function in the photo's sustainability. One participant commented:

> ***They've left some good timber of various ages, future timber trees plus what looks like a lot of the small trees are good timber trees. I think it is sustainable.***

Image 3

The third photo featured a clearcut / overstory removal in a hardwoods stand. No reserve trees were retained and the amount of coarse woody debris was relatively high. A moderate amount of regeneration could be seen in the image.

The majority of responses were emotional and negative in regards to the aesthetic rating. A common theme for this clearcut was a desire to have information regarding the reason for this silvicultural treatment:

> ***Before we criticize it, can you tell us what the purpose was? What kind of trees were there? Because sometimes a clearcut is necessary.***
>
> ***What the purpose is (of the clearcut) could excuse the fact that it looks bad. If those trees were infested with something, or if they needed to extend the clearcut area. . .***

The presence of heavy logging slash was a commonly noted characteristic in this image. Participant concerns varied from wasting this material to the amount the top wood and how it would hinder walking in the area.

> ***Just the whole thing is littered with cut trees. I mean, I said before, that I like to see some down trees but this is a little heavy. From an aesthetic standpoint, I wouldn't want to walk through there.***

Participant perception of sustainability was low in this image. In all the discussion groups, additional actions such as planting were mentioned as a requirement for bringing the stand to a sustainable level. An increased degree of control and planning was common for the sustainability portion of the discussion:

> ***If this is my property, I want to have control of it. I want to see more advanced regeneration. If you leave it to chance and not knowing the amount of deer browsing, it's not sustainable.***
>
> ***Well, the grandkids will never see the next time. It needs some organization so you can actually work with it in the future, I would think.***

There was a shared perception of the clearcut's sustainability across all discussion groups with the exception of one participant in the Clarion County group who remarked:

It depends on what you are trying to sustain. I'm going to go out on a limb here and say that it is (sustainable). I'm thinking they are doing one acre or two acre clearcuts and then doing another one acre clearcut. It looks like that has sustained itself. I'm going by over there (the adjacent stand). . . Again, it looks like pretty good stuff to leave there (slash).

<u>Image 4</u>

The next photo featured a previously thinned hardwood stand with a park-like understory. The residual stand exhibited fairly good form with low stocking. The understory has a small amount of coarse woody debris present as well as very little advanced regeneration or sapling size trees. Initial comments were generally negative and focused on naturalness, low stocking levels and lack of visual diversity:

There is no variety there...You could be standing anywhere in there and be looking at the same thing...I like to see changes. Maybe when I walk into a different section there might be some bigger trees mixed in the new section. A lot of it has to do with the terrain here, it is all flat.

It doesn't look natural. Everything is the same. The shape of the trees... Problems! It makes me ask, "What happened here?" I just keep going back to, why does it look this way?

It's sterile.

There were a several positive comments regarding the ease of walking. An older gentleman with a background in the forest products industry from the Mifflin County discussion group commented, "It's a nice looking forest. There are nice straight trees."

Perceptions of this stand's sustainability were generally negative. Features such as the lack of regeneration, potential interference with fern and the park-like appearance were recognized as detrimental to the function of this forest:

> ***If you take those big trees out, all you are going to be left with is fern and grass. They're just going to take over.***
>
> ***It looks more like a park than a forest to me. If someone came in and timbered that, there would be nothing left. It would be a clearcut. It should be thicker...***
>
> ***It's going to be a long time before you get a stand in here.***

<u>Image 5</u>

The next stand featured was a previously thinned hardwood stand following a second thinning. There is a large amount of younger advanced oak regeneration and a moderate amount of coarse woody debris. The residual stand is small sawtimber/pole-sized with good form. The responses for aesthetic features in this photo generally focused on the amount of 'green' in the picture as well as its perceived naturalness. Several participants commented:

> ***It is a very pretty green. It draws you in... This is more like a green carpeting feeling you get.***
>
> ***The word I keep coming back with is it is "unkempt." It is not a park. It is a natural setting. And the slide before looked like a park. I can see a park in Harrisburg, when I go to the woodlands I want wild.***
>
> ***There is a little bit more mystery to what is behind all that. The other one you could see everything.***

I think it's nice to see all the green on the bottom and all the green on the top.

Several variations occurred within these themes. As with several previous photos, concerns about species composition arose. Some participants had similar remarks revolving around species affecting their aesthetic preference:

For me to have a stronger opinion, I'd like to know what the regrowth is. It looks to me that it's maple but maybe we should get some oak in there.

I like this. I can't tell what's on the ground. It looks pretty good. If it were fern, then it would look pretty bad.

...Anything that regenerates besides ferns, I'm happy.

Another common concern with this image was tree size and its effect on aesthetics. There were comments concerning tree size but the participants in the Mifflin County group were particularly adamant regarding residual tree size:

Looks like they took all the big trees out of there. But in a couple years, you'll never know they (loggers) were in there. The trees in here are too small.

Must have been the Amish that did that. They took it down to 8 inches.

Participant perception of this stand's sustainability was positive. The features noted most frequently were the amounts of advanced regeneration, lack of fern and the amount of green:

I'm assuming with the green there, that it is sustainable. The overstory isn't that thick but it certainly wasn't growing in the previous picture (referring to the clearcut photo).

Very sustainable. Different age groups, a lot of seedlings and saplings coming up.

Image 6

The sixth picture in the series featured a stand that had been repeatedly high-graded. The residual stand is comprised almost completely of low-grade, poorly formed American beech. There is some down woody debris on the forest floor. Some participants recognized the seasonal variation present in this photo – it was leaf off. Visual preference responses varied within groups but some common themes emerged such as naturalness and visual diversity:

> ***I don't think it's bad aesthetically. I think it is very real looking. I think if it were a different time of year, you would have a different impression. It's more real.***
>
> ***I grew up around Tobyhanna State Park where they don't do a lot with the woods. This is what I would expect to see during this time of the year. I don't find it displeasing. That's what I find pleasing about the Pennsylvania woods is that they change.***
>
> ***I like the looks of that picture because you have a variety of things. You've got a big tree there, a moldy log laying there. There are more things to look at and more variety of things to see. I don't know what the species are or the implications but I like it because of the variety of things to see.***

When the discussion was switched to sustainability, the responses showed surprising variability. Being one of the least sustainable stands in the photo series, most participants recognized this stand was in an unsustainable state:

> ***I own my woodlot for a variety of reasons. I've been paying taxes on it since I've owned it and eventually I'd like to get it back. If sustainability doesn't match up with marketability, then it isn't meeting my goals... If the species growing there are not desirable, then it isn't sustainable.***

If we are talking about this from an overall ecology standpoint, not too good. This is not going to turn into a high quality hardwoods stand.

Although most groups recognized the stand featured in this image as unsustainable for various reasons, there were a few responses that gave a different perception. A few participants' responses highlighted attributes, when considered separately, would be a function of sustainability but in the context of this stand would not be a sustainable trait:

I would say sustainable. You have all those seed trees.

This is sustainable in a natural state. Biologically, it will keep sustaining itself.

<u>Image 7</u>

This image featured an overstocked, mixed hardwood stand with large diameter dominant overstory trees and a midstory consisting principally of poorly formed red maple. This stand also had a moderate amount of coarse woody debris and snags as well as some evidence of ground-level vegetation (ground pine). Visual preference themes were generally positive highlighting an inclination towards large diameter trees, visual diversity, perceived naturalness and tree form:

I just love to get lost in my own little world. Whether it is on my own land or someone else's and I can't see roads, houses, then it really is a great experience.

It's diverse. You don't know what you are going to find next. Every step would be a surprise.

Repeated undesirable traits identified in this stand focused on the high stocking level. Several participants commented on the closeness of the trees being an undesirable trait of this photo:

> ***I don't want to be in that forest. It is too cluttered...claustrophobic. You can't see anything. The trees are too small and you can't walk through it very easily. All you see is trees clumped together. There is no view.***
>
> ***To me, I would like to get some of those out of my way so I can see better. Too thick for me.***
>
> ***Too many trees, too close together, too small.***
>
> ***I wonder what this place looks like in the Spring and Summer? I wonder if there is enough light to get down to the floor***.

When the discussion was switched to the context of sustainability, there was some inconsistency and indecision within the groups. Most remarks reiterated the need for thinning the stand to free up growing space and available light as well as a need for diversity:

> ***The diversity of species tells me that we have a fairly stable ecosystem. We could have a disease come in and knock out one species, we still have a lot left.***
>
> ***Unsustainable unless you thinned it out. There would be no benefit to leaving it like this. You wouldn't get any new trees growing.***

There were several comments that illustrated a disconnection between a desire for ecological sustainability and stewardship. Two participants (one in the Mifflin County group and the other in Huntingdon County) remarked:

> ***If a tree is no good for wood or anything, there is no use keeping it around. You have to have potential.***
>
> ***I would really be torn between economics and the aesthetics. I would have to think long and hard before doing that (thinning) to mine.***

Image 8

The next photo in the series shows an oak stand after a first stage shelterwood harvest. There is an acceptable amount of slash for this type of operation and a small amount of ground disturbance. As with the other image depicting an even-aged silviculture harvest, the responses for this photo were generally negative and frequently emotional. The aesthetic features identified as displeasing were primarily the low residual tree density, ground disturbance as a result of harvesting, and the amount of slash left on-site:

> ***This is a sad looking site to me. It looks like it has been devastated.***
>
> ***I think scattered tops like this takes away from the beauty of the thing. But scattered tops like this is healthier because it allows seeds to start in there. If you make a big brush pile, it's better than tops like this.***
>
> ***I would have been happy if they clearcut that as compared to leaving it the way they did. Well, I'm assuming from a species perspective that they left a lot of trash trees. I can't identify those species but it sure doesn't look like they left any good seed-trees. The ground looks like it was beat up quite a bit as well. There is a lot of bare ground. Again, not knowing the history, I'm assuming that it was a good area that was stripped.***

Seasonal differences were commonly mentioned in regards to the aesthetics of this photo in particular. In several of the discussion groups, participants recognized the role time and season would have on this site. One participant from the Clarion County group commented:

That woodlot there would look completely different if you saw it in the summertime. In ten years, there are going to be a lot of straight trees in there.

As with the clearcut photo, there were numerous emotional responses to the shelterwood photo. There were several remarks that implied something illegal or unprofessional taking place in this photo:

That didn't have a consulting forester attached to it.

It looks like they did that after closing time...

The ground has been disturbed too much. Everywhere in that picture it looks like the ground has been disturbed. In this wet spot (foreground), that just looks like it wasn't taken care of.

In general, most PFLs considered the harvest featured in this photo as an unsustainable practice. The participants often spoke of the need for additional management activities such as planting, lack of seed-producing trees, the soil condition and openness of the stand. A gentleman from the Huntingdon County group remarked:

To me, that is one of those cuts you don't want to see. I don't see a lot of tree damage here, but I also don't see what I would consider a lot of seed-trees left.

Some owners believed the increased sunlight generated by this harvest would be beneficial to the future stand. There was only one participant in the Blair County group who recognized this harvest as a shelterwood and felt it would be a sustainable practice.

Image 9

The ninth photo in the series featured a mixed hardwoods stand

following a diameter-limit harvest. The residual stand consists of low grade, poorly formed stems and heavy amounts of coarse woody debris. The aesthetic features commonly noted as not pleasing in this photo were difficult physical access and the overall residual tree appearance. Several participants in the Blair County group commented on their acceptance of these conditions but only in a limited area. One such response was:

> ***I don't like it. It isn't inviting. I would like to see a patch like this on my property, but I certainly won't want to see the entire property like this. I don't own my woodlands to be perfect... I want it to be diverse.***

When the facilitator switched the discussion to focus on sustainability, there was some inconsistency between the groups. On a whole, the majority of PFLs believed this was a sustainable practice. Those who perceived this photo as sustainable cited the effect the dense slash would have on reducing deer browsing on seedlings and the increased wildlife habitat potential (particularly songbirds).

> ***It's coming back pretty good. Sustainability and aesthetics don't necessarily agree.***
>
> ***For habitat this is good but for regrowth it is a zero. I guess it depends on what a person is looking for. I'm not a hunter, so I look at it from a different point of view...***

<u>Image 10</u>

The last photo in the series featured a stand following a woody biomass removal treatment. All coarse woody debris had been removed from the site leaving a very park-like understory.

The residual trees exhibit good form. Most participants identified this stand as appearing unnatural and resembling a tree plantation. A participant in the Blair County group commented:

> ***Would we want our state parks to look like this? We keep coming back to the word "natural," this looks unnatural. There may be good sound forest management practices here, but should our state parks look like this. No! It doesn't look natural.***

When the discussion over this photo was transitioned to focus on sustainability, there was a degree of indecision. Long pauses of silence were noted in the recordings while the participants contemplated the image. All the groups shared a similar feeling of confusion with this stand as well as a concern for increased susceptibility for windthrow:

> ***I don't know what it is, but I don't like it. If it is young trees, it seems to me like it should be a lot denser. Something's not right there.***
>
> ***I'll bet there will be a lot of blowdown trees. . . It looks like there is some regeneration, maybe some stump sprouts. But it still isn't telling me why they left that stuff (trees) there.***
>
> ***What I don't like here is I'm looking at it, but I can't understand what happened. It just doesn't look like anything I've seen. I can't place it. I do not know what I'm looking at. I'm trying to decide what happened...***

Summary

There were highly variable and emotional responses to the photos in the presentation. Although consistent with past research, several new perceptions emerged from PFL responses. To identify common themes, the content of the meetings was transcribed and analyzed and are discussed in the next chapter.

Chapter 5

DISCUSSION

In this chapter, I discuss the research findings and provide a synthesis of common themes drawn from the data analysis. Eleven common themes were identified within and across groups.

Theme 1: Clearcuts are neither aesthetic nor sustainable

For the photo featuring a clearcut (photo 3), participants did not hesitate to associate a sense of unprofessionalism and misuse with this activity. The responses were often emotional. Notably, these responses were consistent with published literature on clearcutting and visual preference for silvicultural treatments (Kearney, 2001; Bliss, 2000; Gobster, 1996; Ribe, 1989). All groups expressed dislike for the aesthetics represented by this image of a clearcut. In addition, most groups rated the clearcut photo an unsustainable practice:

> ***It tells me that when they did that, there were no plans to sustain it. Whatever came back just came back. Clearcutting may be a good thing if they plan what is going to be coming back and control it.***
>
> ***From a sustainability standpoint, I don't see any plantings or anything that have been done since it was cut. There are no seed-trees.***
>
> ***No hope at all!***

Participants commonly focused on the amount of slash as aesthetically displeasing and wasteful. However, there were several individuals who acknowledged the role this material had in the nutrient cycle and preventing deer browsing on seedling growth. More importantly, there was recognition of clearcutting as a forest management tool; however, recognition of these operations as a forest management tool did not offset their dislike of its aesthetic qualities:

Just because I understand it, doesn't make it more aesthetically pleasing.

Even if you like clearcuts, would you like to open the windows in your house and see that!?

There was one participant in the Clarion County meeting that rated the clearcut as sustainable but with a degree of hesitation:

It depends on what you are trying to sustain. I'm going to go out on a limb here and say that it is (sustainable). I'm thinking they are doing one acre or two acre clearcuts and then doing another one acre clearcut. It looks like that has sustained itself.

<u>Theme 2: Species preference affects visual preference and sustainability</u>

As described in Ribe's (1990) research, species composition was a concern in both the aesthetics and sustainability discussion associated with several of the photos. Often, when a participant was unable to identify the species in the photo, an expression of species preference was provided.

It sort of looks like it is the wrong stuff growing in there, but I'm not sure. I would like to see red oak and not maple and birch and striped maple.

. . .If the species growing there are not desirable, then it isn't sustainable.

The diversity of species tells me that we have a fairly stable ecosystem. We could have a disease come in and knocks out one species, we still have a lot left.

Besides timber producing species, there were other species disliked by participants. Perhaps due to the participants education, there was a bias against ferns. When asked to clarify whether the presence of fern was an aesthetic quality or related to sustainability, most participants said its presence affected their aesthetic preference. Only a few individuals said they believed the presence of fern in the understory was

aesthetically pleasing. Competing vegetation had a negative impact on both aesthetics and sustainability rating.

Theme 3: Desire for mystery and diversity

As discussed by Kaplan and Kaplan (1989) diversity, both in visual preference and ecological settings, was another commonly discussed theme. Participants often expressed a desire for mystery and visual variability when addressing aesthetic qualities. On several occasions across the groups, there was a desire to see new scenery (mystery).

> ***There is no variety... You could be standing anywhere in there and see the same thing... Variety is the spice of life.***
>
> ***I like the looks of that picture because you have a variety of things. You've got a big tree there, a moldy log laying there. There are more things to look at and more variety of things to see. I don't know what the species are or the implications but I like it because of the variety of things to see.***

Along with the desire for mystery and diversity in aesthetic preference, participants recognized the importance of species richness for sustainability. Noted previously, there was a definite bias towards stands containing certain species, particularly red maple.

> ***If it were all red maple or something like that, I'm not sure I would refer to it as sustainable...***

Theme 4: Tree size and density influences perceptions of aesthetics and sustainability

Tree size and stand density typically were the first attributes mentioned by participants. There was often a desire to view older, mature trees in the photo. This desire to view large trees was often followed with comments expressing concern for overcrowding of less dominant trees and desirable regeneration. There was concern about stands being "too thick" or "not thick enough." These results were consistent with the

findings in Schroeder and Daniel (1981) and Ribe (2002) which established a relationship between visual preference and tree density.

Predictably, there was preference by participants for large trees which were considered important for achieving sustainability:

> ***I think it will because they've left some good timber of various ages, future timber trees plus what looks like a lot of the small trees are good timber trees. I think it is sustainable.***
>
> ***It was a good logging operation. They left some big seed trees there. They didn't destroy it.***

As long as large diameter trees were present in the photo, sustainability ratings increased towards sustainability. This phenomenon was particularly evident in the photo featuring the high-graded stand (photo 6). The presence of a large American beech in the center of the photo lea several participants to rate this photo as sustainable.

<u>Theme 5: Accessibility and mobility affect visual preference</u>

Accessibility and ease of mobility within the stand is a function of stand density. In all sessions, remarks were made regarding the ease of walking through the forest shown in the photo. Often, if a stand was deemed too difficult to walk through, its visual preference rating was in turn lower:

> ***I don't want to be in that forest. It is too cluttered. Claustrophobic. You can't see anything. The trees are too small and you can't walk through it very easily. All you'll see is trees clumped together. There is no view. . .***
>
> ***Aesthetically, it is not very pleasing. No, I'm not going to go take a walk in there.***
>
> ***It's not somewhere I'd like to take a walk. Looks like a field that some trees grew up in. Nothing appealing.***

The ease of mobility was a common aesthetic concern but did not appear while discussing sustainability.

Theme 6: Seasonal variation and 'green' affects visual preference

Northeastern forests depict clear seasonal variability. Temporal variability and "greening-up" all had an effect on preference ratings (Benson and Ullrich, 1981; Hull and Buhyoff, 1986; Palmer, 1990). Photos presented in the discussion groups were taken during both dormant and growing seasons. Participants were accustomed to recognizing seasonal differences between photos, often noting, "I would like to see this photo in the summertime to compare it." Even though participants recognized seasonal differences, it appeared to have little effect on visual preference.

The word "green" was used 25 times in the various discussions. The presence or absence of green, particularly in the understory, emerged as common focus in several groups:

> ***This reminds me of a section of woods that is next to one that is penned in (deer pen). Whether it is desirable what is coming back or not, it is still green and about yea high.***
>
> ***I like this. It's green. It's not grass, it is things coming back. I would like to hunt that.***
>
> ***It is aesthetically pretty. It is green, the fact that the sun is shining through. It has some different shades of green in it as well ...***

Visual preference for green understory trees was often directly linked to the perception of sustainability.

Theme 7: Even-aged management bias

The two photos (photos 3 and 8) that elicited the most emotional responses were those depicting even-aged silvicultural treatments. On a whole, participants rated the aesthetics and sustainability of the clearcut and shelterwood photos the lowest of all those

viewed in the presentation. In several groups, unprofessional and even illegal activity was associated with both the even-aged management photos.

> ***Looks like they did it after closing time...***
>
> ***It's a clearcut, I don't like clearcuts. The only thing that will come up there is maple trees and birch...***

The Ribe (1989) and Vodak et al., (1985) studies illustrate a similar bias for stands managed under even-aged systems. Participants rated the shelterwood harvest more sustainable than the clearcut. The retention of standing trees in the shelterwood photo had an effect on sustainability ratings between the two photos.

<u>Theme 8: Desire for background information</u>

There were numerous occasions when a participant would request more information about the background or decision making that led to the activity depicted in the photo. To avoid the bias associated with certain terms, facilitators did not provide any background information about the photo. When asked to clarify, the effect of information on visual preference varied among the groups. Several participants remarked:

> ***Just because I understand it, doesn't make it more aesthetically pleasing.***
>
> ***That's the thing. If you knew more about why it was done and knew about where it is in reference to the big picture of the landscape.***
>
> ***What I don't like here is I'm looking at it, but I can't understand what happened. It just doesn't look like anything I've seen. I cannot place it. I do not know what I'm looking at. I'm trying to decide what happened.***

Some individuals commented that having this background information would make the depicted treatment more acceptable. Similar findings about the role of information on visual preference were also found in the literature (Anderson, 1981; Vodak et al., 1985; McCool et al., 1986) and were in concert with these results.

Theme 9: Perceived naturalness is important for aesthetic and sustainability acceptance

At least once in every group, participants expressed a desire to view a "natural" forest. This desire became particularly evident when participants discussed the photo of the woody biomass harvest (photo 10) and the previously thinned hardwood stand (photo 4). After viewing the woody biomass harvest, several participants remarked:

> ***That looks so unnatural there! I don't like it at all, not for any reason.***
>
> ***It looks like they are just starting over. There will be a lot of trees here in the future. They almost look like they are planted that way. Like bamboo... It doesn't look natural. Something doesn't look right.***

As seen in the "desire for diversity" theme, several participants compared the stand to a tree plantation which was an aesthetically undesirable characteristic. The presence of human intervention in an attempt to control natural processes had an effect on the perceived sustainability. Photos that were deemed "unnatural" were typically those rated lower both aesthetically and sustainably. These responses followed the same trend in the literature (Magill, 1994; Kaplan and Kaplan, 1989; Fenton, 1985; Bliss, 2000) on perceived naturalness.

Theme 10: Alternative management can improve aesthetics and sustainability

Participants viewed the photos while always suggesting alternative management strategies for the depicted stand. As opposed to perceived naturalness, suggestions were often made to use another form of management to improve the forest in the photo:

> ***Unsustainable unless you thinned it out. There would be no benefit to leaving it like this. You wouldn't get any new trees growing.***
>
> ***I like the way it looks. But in the future it is going to be too thick. It should be thinned out right now. It looks like a thicket. It doesn't have any future as it is now.***

These responses could be attributed to the amount of prior education about silviculture the members of WOAs were exposed to in workshops. Participants often believed human intervention was needed to improve the state of the forest.

Theme 11: Focus on timber production

Of all the concerns and preferences expressed by the group participants, the most commonly referenced theme related to timber production. Comments on aesthetics were often framed around the importance of marketable timber with a focus on tree form and high-valued species preference. The presence of red maple was frequently interpreted as undesirable.

> ***Aesthetically it looks great, but from a timber management aspect, I don't want anything to do with it. It might be a nice place to birdwatch.***
>
> ***This is a nice stand of timber if you took out some of the junk trees and left some of the big ones.***
>
> ***You could only take a couple trees out of there in the next twenty years. You would have to wait another twenty years before you could take anything else out. It doesn't look like there are enough trees for anyone to come in and cut it. There wouldn't be enough. Unless you wait until forty years and come in and cut them all at once.***

The majority of participants stated a preference for oak species and other timber producing species such as black cherry. Those individuals expressing this species preference said this was a function of aesthetics. Several individuals mentioned:

> ***The thickness doesn't bother me, but the species does. Right away, I think I see red maple and birch in there. It's not that I don't like them, I just don't like them in great numbers.***
>
> ***I think this is a high grade. Probably species they didn't want.***

When a forest in the photo presentation did not appear to have the potential to produce high quality timber of a select group of species, the picture was often judged as displeasing. As with the findings in Ribe (1989), if trees were deemed undesirable for timber production, the visual ratings decreased.

Summary

Participants in the PFL discussion groups recognized the ecological management and societal value of commercial timber harvesting. However, there was clearly a bias toward certain types of silviculture treatments and residual stand conditions. There appeared to be a desire for balance between valuable forest products and sound forest management practices. This desire for balance between monetary value and ecological sustainability was often crossed with a desire for “natural” appearance.

All participants in the study desired a sustainable forest; however, there were several instances when unsustainable practices were deemed sustainable due to favorable aesthetic features and vice versa. In the photos depicting high-graded forests (photos 6 and 9), several PFLs believed the photo showed a sustainable activity. In contrast to this, the shelterwood photo (photo 8) was generally seen as unsustainable.

Economics emerged as a common concern in sustainability discussions. The Clarion County groups focused less on economics and timber productions and rather were concerned more with the ecological implications of the various treatments. The Mifflin County group focused almost exclusively on timber.

Demographics of the group sampled in this study had little to no effect on visual preference and sustainability responses. Consistent with Ho et al. (2005), gender did not appear to have any significant effect upon PFL responses in this study. Both male and

female participants shared similar concerns and aesthetic preferences across the groups. A few of the older participants were more accepting of the effects of clearcutting than the younger participants in the group. Overall, it appeared age had little to no effect upon PFL responses.

Given the diverse nature of PFLs and their motivations, finding common ground among themes that emerged in this research was difficult. Some emergent themes contradicted each other (e.g., perceived naturalness vs. alternative management). It is very possible that the desire for aesthetically pleasing conditions must be partially sacrificed to meet the need for forest products production and vice versa.

The balance between aesthetic preference and sustainability could have significant impacts on available timber supply, particularly in the case of woody biomass harvesting. As described earlier, the majority of responses to the photo depicting a woody biomass harvest (photo 10) were generally negative. Participants were unable to accept the reason behind the disturbance in the photo and felt it took away from overall sustainability. This could significantly impact biomass feedstocks.

The next chapter reviews the common themes that emerged in this study. I also identify study limitations discovered through the planning and execution of the research design and draw my conclusions from these findings.

Chapter 6

CONCLUSION

This chapter synthesizes findings from my research and discusses its implications for future research efforts. The purpose of this study was to identify specific visual features associated with timber harvesting that PFLs find aesthetic and assess how these visual features are perceived by forest landowners as affecting forest sustainability.

Private forests will be increasingly important to the forest products industry as well as a potential source of feedstock for bioenergy. Given this rationale, PFLs were the focus of this research. By assessing what visual features affected forest sustainability, it would be possible to determine those changes in aesthetic quality PFLs would accept to accomplish a particular forest management objective.

To minimize the amount of "background noise" commonly associated with field tours, a photo presentation method was selected to efficiently demonstrate forest management activities. Although this research is cost effective and time efficient, there are limitations. There were occasions when participants were unable to discern details to completely develop an opinion. The importance of distinguishing between species and other stand characteristics was important as participants evaluated visual preferences. Field studies would allow PFLs to more closely examine details such as tree species in the study area.

Given the location and climate of the study area, one of the unique challenges in selecting photos was seasonal variations. Many participants recognized the inherent visual differences associated with the changing seasons and it appeared to have an effect on visual preference. If the forest in the photo was 'green', if was often rated higher

aesthetically. Future studies should address this issue by having the photos used in the presentation be in a single season, rather than across multiple seasons as in this study.

PFLs are a very diverse group representing numerous vocations and education levels. The sample population examined in this study was within the average for demographic data collected on PFLs in Pennsylvania. Neither age, ethnicity, nor gender appeared to have any significant effects on visual preference or sustainability responses. As discussed earlier, some of the older participants were more accepting of the effects of clearcutting but shared the same distaste for its visual features as the younger participants.

Using the term "sustainability" presented its own unique set of challenges. All participants had some exposure to timber harvesting and had knowledge of the benefits of good stewardship practices. Often, sustainability was framed around marketable timber production and economics when assessing visual features. There were a few occasions when a participant would acknowledge other traits of forest sustainability beyond sustainable yield. A participant in the Clarion County group remarked, "Again, I think this comes back to 'what is sustainable'? Are we talking about timber harvests? It doesn't look sustainable for timber harvests."

As discussed in previous sections, several common themes emerged after analyzing the facilitated discussion transcripts. These common themes often focused on preserving a stable ecosystem while in turn maintaining the capacity to produce high-quality forest products. Future studies may attempt to determine which of these priorities is most important to PFLs in regards to forest management activities.

Some emergent themes contradicted each other. This was most evident with perceived naturalness and alternative management. Although there was a desire for natural settings, human intervention in the form of silviculture was perceived to be necessary to reach a desired sustainable state. This contradiction raises the question, at what point is a managed forest perceived to be unnatural. At what point the degree of disturbance due to timber harvesting is deemed “unnatural” could be examined in future studies.

While addressing questions raised by Sheppard’s (2001) theory of an ecological aesthetic, a fundamental difference materialized between visual preference for a given forest management activity on public versus private forestland. PFL preference (both aesthetically and ecologically) emerged for landscapes with the capability to produce high-quality forest products from a certain set of high-valued species. This preference was contradictory to the existence of an ecological aesthetic in that it partially ignored the interrelationships between species diversity and sustainability.

The most common occurrence in all groups was the desire for alternative management to correct human-made mistakes in the forest. PFLs often proposed an alternative management strategy in order to attain a sustainable state. One participant in the Mifflin County meeting commented, ”Unsustainable unless you thinned it out.” Future studies may consider examining PFL’s desire for human intervention in achieving sustainability.

Responses on visual preference were consistent with previous research. However, the link between aesthetics and sustainability remained undefined. Participants regularly associated an aesthetically pleasing feature directly with sustainability regardless of its

role in the ecological function. In some cases, unsustainable features that had favorable aesthetic qualities were preferred over traits that would be more sustainable.

The results of this study revealed commonalities between PFLs and the general public studied in the literature over those aesthetic features of stand conditions and silvicultural prescriptions. Stand density, species composition, amount of downed woody debris and perceived naturalness are just a few conditions identified by this study as playing a role in PFL visual preference and perceived sustainability ratings. The difference between the general public and the PFLs sampled in this study was the understanding and prior knowledge of silvicultural treatments.

This study looked at the relationship between visual preference and forest sustainability in a group of stakeholders directly impacted by forest management activities and decisions. Those involved in the study were knowledgeable of the consequences of improper harvesting techniques. This may relate to their involvement in landowner workshops, personal experiences, and training sessions. Even with this prior knowledge, however, there was a disconnect between aesthetic preference and sustainability, particularly in the case of even-aged silviculture prescriptions.

All participants in this study were members of county-based woodland owners associations and therefore had some prior knowledge or training regarding sustainable forest management techniques. As documented in the research data, possessing knowledge of silvicultural operations had an effect on the participants' responses. In future studies, the analysis of PFLs that do not belong to a landowner association could be studied in order to assess the impacts of such membership.

Data collection and analysis was performed in a dynamic, adaptive manner as dictated by grounded theory. This method of analysis was selected to provide a rich understanding of PFL perceptions. Analyzing emergent themes worked well for the analysis of data in this study but did have its limitations. Future studies may seek to apply the findings from this study in combination with other mixed methods analysis.

Group size appeared to be an important factor in gaining PFL responses. In smaller groups, participants were more likely to provide opinions without feeling intimidated by speaking before a large group. In future studies, more meetings with fewer participants may gain richer data by providing a more intimate setting for the participants in the group discussion.

PFL perception directly affects their willingness to harvest forest products and actively engage in forest management activities. If PFLs are unwilling to accept the aesthetic impacts of timber harvesting, they will be unwilling to harvest. This study demonstrates the importance of a better understanding of this relationship.

This study demonstrated linkages between aesthetics and sustainability; however, these may be fairly limited in a private forest management setting. As demonstrated by this study, forest management activity causes varying degrees of disturbance to the aesthetic qualities of a forest. The amount of disturbance which is deemed acceptable or detrimental to the stand has proven to be a complex subject to derive from PFLs. Being a complex, multi-dimensional issue, future studies should place a higher degree of importance on PFL perceptions through assessment by mixed methods research.

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APPENDIX A

Facilitator Script for PFL meeting

Introduction:

"(Salutations) My name is Dan Lowenstein and I am a master's degree candidate from the Penn State School of Forest Resources and Human Dimensions of Natural Resources and the Environment dual-title inter-college graduate degree program.

As an icebreaker, I would like to begin by asking each of you to introduce yourself and to tell us a bit about yourself. (Introductions)

Thanks.

We are going to be looking at how private forest landowners perceive the aesthetic qualities of forested landscapes. During our time today, I will be showing you a series of photos and we will be discussing the specific visual qualities of these forests as seen in the photos."

> *(Aesthetics according to the dictionary is a sense of perception dealing with or relating to beauty, pleasing in appearance,)*

Photo #1 (mature unmanaged forest):

"In this first photo, we see a hardwoods forest with typical structure for our area. To start off our discussion on forest aesthetics, what visual features stand out and in what way are they aesthetically pleasing or disagreeable?"

(ENCOURAGE DISCUSSION FOLLOWING EACH PHOTO SHOWN)

Photo #2 (mature forest, partial thinning):

"What visual features stand out and in what way do you find them aesthetically pleasing or disagreeable?

> *(Silviculture, according to the 1998 Dictionary of Forestry, is the art and science of controlling the establishment, growth, composition, health and quality of forests to meet the diverse needs and values of landowners and society on a sustainable basis)*
>
> *(Management is defined as the act, manner, or practice of managing; handling, supervision, or control)*

Photo #3 (Overstory removal (clearcut) hardwood stand):

"What visual features stand out and in what way do you find them aesthetically pleasing or disagreeable?

Photo series #4 (Previously thinned stand) :

"What visual features stand out and in what way do you find them aesthetically pleasing or disagreeable?"

Photo #5 (Previously thinned stand, second thinning):

"What visual features of this photo do you find aesthetically pleasing or disagreeable?"

Photo #6 (Previously thinned stand after high grading):
"What visual features stand out and in what way do you find them aesthetically pleasing or disagreeable?"

> *(Timber Stand Improvement or stand improvement, is defined by the 1998 Dictionary of Forestry as an intermediate treatment made to improve the composition, structure, condition, health and growth of stands)*

Photo #7 (Overstocked mixed hardwoods stand):

"What visual features stand out and in what way do you find them aesthetically pleasing or disagreeable?"

Photo #8 (Shelterwood treatment):

"What visual features stand out and in what way do you find them aesthetically pleasing or disagreeable?"

Photo #9 (Diameter limit harvest with heavy DWD):

"What visual features stand out and in what way do you find them aesthetically pleasing or disagreeable?"

> *(Diameter limit cutting is defined by the 1998 Dictionary of Forestry as the removal of all merchantable trees above or below a specified DBH with or without cutting cull trees)*

Photo #10 (heavy biomass removal):

"What visual features stand out and in what way do you find them aesthetically pleasing or disagreeable?"

> *(Biomass is defined by the 1998 Dictionary of Forestry as the wood product obtained from whole-tree chipping of all or some portions of the tree including limbs, tops and unmerchantable stems usually for energy production)*

"Now that we've viewed the alternative treatments of these hardwood stands, I would like to discuss forest sustainability. We will now look at the same images a second time. This time, rather than looking at aesthetics, I would like you to consider forest sustainability. What do you see in the image that speaks to forest sustainability in either a positive or negative way."

(Forest sustainability is defined by the 1998 Dictionary of Forestry as the capacity of forests to maintain their health, productivity, diversity and overall integrity, in the context of human activity and use)

(REPEAT PHOTOS AND DISCUSSION FOLLOWING EACH PHOTO)

These are all the questions we have for today. Are there any other things you would like to add or discuss?

We thank you for your time.

APPENDIX B

<Name>
<Address Line 1>
<City, State, ZIP>

Dear <Name>

The Penn State University is conducting a research study on forest aesthetics and sustainability in Pennsylvania. As part of this study, we are hosting a focus group session in (Community) on (Date) at (Time).

Using public tax records, we have identified you as a forest landowner and believe you may have an interest in forest management issues affecting Pennsylvania. Your insights are important and will help us understand concerns and issues forest landowners have surrounding forest aesthetics and sustainability in our state.

At the focus group session on (Date) we will seek your input on forest aesthetics and sustainability in Pennsylvania. Through this discussion we hope to understand your perceptions of forest management activities and practices. We anticipate that the discussion will last about two hours. **As a token of appreciation, a meal will be provided before our discussion.**

Your participation in this discussion is completely voluntary. We will develop a report from the meeting you attend and other sessions we plan to hold this spring. In this report, we will report a summary of our findings for the entire study. Individual input will not be reported or be attributable to individual participants.

If you have any questions about the study, please call Dan Lowenstein or Jim Finley toll free at 1-800-235-9473. If you have any questions about your rights as a research participant, please contact the Pennsylvania State University Office for Research Protections at (814) 865-1775. Please keep this letter for your own records in case you have further questions about this project and would like to contact us in the future.

Thank you for your help in this project.

Sincerely,

Daniel A. Lowenstein
Master's Candidate
School of Forest Resources & HDNRE

Dr. James C. Finley
Professor of Forest Resources
School of Forest Resources & HDNRE

APPENDIX C

Photo 1: Image source - James C. Finley, Penn State University

Photo 2: Image source – www.forestryimages.org

Photo 3: Image source – James C. Finley, Penn State University

Photo 4: Image source – James C. Finley, Penn State University

Photo 5: Image source – James C. Finley, Penn State University

Photo 6: Image source – Ralph Nyland, SUNY University

Photo 7: Image source – James C. Finley, Penn State University

Photo 8: Image source – Joseph Harding, Penn State University

Photo 9: Image source – James C. Finley, Penn State University

Photo 10: Image Source – Metzler Forest Products, LLC

APPENDIX D

Transcript of Clarion County PFL discussion group – Held June 17th, 2010

Following salutations and introduction of participants, Lowenstein describes what the participants should be looking at in the photos, particularly focusing on aesthetics:

PHOTO 1

Betsy: "I like it from the standpoint of a state park, a park-like setting. It's a little bit too pristine. You don't see any brush piles or snags."

Mark: "I don't see much of an understory there. It looks very even-aged. . ."

Lowenstein had to then reiterate the difference between focusing on forest management versus forest aesthetics.

Bill: "It's open. You could walk through it without too much trouble. There aren't a lot of brambles."

Joanne: "You could even throw down a blanket and have a picnic there." *Lowenstein clarified by asking if this would be a place the participants would like to visit. There were several participants that agreed.*

Mark: "Aesthetically it looks great, but from a timber management aspect, I don't want anything to do with it. It might be a nice place to birdwatch. There isn't a lot of midstory."

Debra: "I don't know if there's anything I don't like but just the fact that there aren't any different trees. They all look pretty much the same age. They're boring. There's nothing breaking it up. It's too planned, too uniform. It doesn't look wild enough."

Jackie: "It looks very fake."

PHOTO 2

Joanne: "It looks like a nuclear bomb hit it."

Mark: "Actually, that doesn't look that bad."

Joanne: "Maybe it's the time of the year." *Lowenstein asked if the season would alter opinions on aesthetics. Several participants agreed that it would improve the aesthetic features.*

Betsy: "It's too open."

Joanne: "Yeah, that's kind of depressing to me."

Dave: "Somebody's dreams of farmland have gone awry but it's not a forest yet."

PHOTO 3

Joanne: "Boo!"

Betsy: "A minus one on a scale of ten."

Dennis: "I don't know what they are doing here. Maybe they're building a shopping center or something. . . "

Mark: "Aesthetically that's terrible."

Joanne: "Aesthetically that's horrid."

Dennis: "I don't see any young trees coming up, I don't see any future at all."

Mark: "Aesthetically, that's going to look a lot different in five years." *Lowenstein asked participants what specific features of the clearcut were "an eye-sore."*

Bill: "All the clutter."

Jackie: "It bothers me that they aren't going to do anything with all that timber that's there."

A small discussion breaks out about health benefits of leaving topwood on-site. Several comments arose about the reason why this property was clearcut.

Betsy: "You would have a hard time walking through here."

Dennis: "I'm not sure what that is there, but it could be regeneration." *Lowenstein asked to clarify what effect species would have on aesthetic preference.* "Depending on why they did this and what species that is in the midground, it might be showing some kind of life. Some sign of regeneration would be much more acceptable."

PHOTO 4

Betsy: "It's not somewhere I'd like to take a walk. Looks like a field that some trees grew up in. Nothing appealing."

Mark: "No good sized trees there. Looks like a high-grade operation." *Lowenstein asked why the participant thought this was an example of high-grading.* "Because of the trees that were left there. They are all small in diameter. It's very open. You might run into a lot of multiflora rose in there."

Dennis: "There's no understory, there's no midstory. . . it's not good habit."

Joanne: "It's sterile." *Several other participants agreed with this term.*

Mark: "It's going to be a long time before you get a stand in here."

Lowenstein asked participant to explain further about the stump sprouts / clumps in the photo. A participant was asked if this made the photo more acceptable.

Bill: "I looks like there might be more understory around."

PHOTO 5

Dennis: "I like this. I can't tell what's on the ground. Seedlings. It looks pretty good. If it were fern, then it would look pretty bad." *Several participants agreed with the comment on fern. A small side discussion begins about tree size. Lowenstein asks how tree size affects preference.*

Bill: "I think if you have a few big ones. You have diversity."

Joanne: "There's no way I could take my kids through this. There's no way." *There was a question on what context to view these photos from.*

A few participants made comments regarding wildlife habitat. When asked if this affected preference,

Bill: "Yeah, there might be some good grouse in there."

Betsy: "I think it's nice to see all the green on the bottom and all the green on the top." *There were a few comments about the difficulty of separating the knowledge of forestry from one's aesthetic preferences.*

PHOTO 6

Mark: "I don't see anything aesthetically displeasing."

Joanne: "I don't think it's bad aesthetically. I think it is very real looking. I think if it were a different time of year you would have a different impression. . . It's more real."

Betsy: "I'd have to disagree. It looks like the trees were all planted in a line and they're all pretty much the same age. It looks too planned. There is one decent size tree but it looks like everything is the same."

Bill: "I don't care for it at all. There is no diversity of trees. If you went looking for wildlife, I think you would avoid this area."

Mark: "I'm looking at that log laying there and trying to figure out what that tells me. *Lowenstein asked about aesthetic preference.* "Yeah, it looks ok."

Dave: "I wouldn't mind seeing that on my property. You've got some dead stuff there."

Betsy: "There is a lack of evergreens here. There are no conifers at all."

Several participants acknowledge that the major species in the picture is beech.

PHOTO 7

Bill: "I like it."

Debra: "There's a nice cherry that you could work around."

Joanne: "You just want to go for a walk in there and keep walking and see what you are going to see. There is a lot going on."

George: "You know my woods look like this in the winter. If you walked in there at this time of the year, there is just nothing. You don't see the six to eight feet twigs there. It's really hard to tell in a setting like that how much understory you really have."

Jackie: "To me I would like to get some of those out of my way so I can see better. Too thick for me."

Joanne: "I like it. The more trees the better."

Debra: "I like the colors of it; the different shades of the trees."

Betsy: "It's diverse. You don't know what you are going to find next. Every step would be a surprise."

PHOTO 8

Joanne: "That didn't have a consulting forester attached to it."

Jackie: "It depends on what they want."

Several participants, after being asked to focus on aesthetics replied that this looked like "Junk trees." *A small discussion began about the regeneration expectations following this form of harvest.*

George: "To me, this looks like a field that was left to grow over thirty years and they have been coming in and just cutting out the firewood."

Lowenstein asked about the presence of topwood and slash. After a side discussion about the benefits of slash left on-site, several participants said they felt it was not aesthetically pleasing.

Mark: "That woodlot there would look completely different if you saw it in the summertime. In ten years, there are going to be a lot of straight trees in there."

Joanne: "Some of the ones that are standing look dead."

Joanne: "I see a couple conifers in there but that isn't what I mean. Those don't do a thing for me."

PHOTO 9

Debra: "First thing I'd think is that there would be a lot of wildflowers here."

Betsy: "To me it's not aesthetically pleasing."

Bill: "If this was just clearcut it wouldn't look so bad. If you clearcut something, in ten years it won't look so bad but when you leave stuff like this, twisted and ugly. They're not ever going to do anything (the trees)."

Jackie: "Aesthetically, it is not very pleasing. No, I'm not going to go take a walk in there."

Joanne: "I like it only from the standpoint of potential." *Lowenstein asked to clarify its potential*, "One day it looks like some of that undergrowth will grow into something. I'm not looking at as managing it for a timber harvest but for its natural state. . . It could be an attractive place depending on how you look at it."

Several participants made comments about walking in this photo. "No, you aren't taking your family for a walk in there. That is a lawsuit waiting to happen. . . I'd like to see some trails."

PHOTO 10

Jackie: "Lollipop trees!"

Bill: "It looks like a good plantation or something."

Joanne: "It looks stripped. It looks like they tried to get something to grow and this is what came up."

Debra: "I do like it. It looks a field that had been reforested. . ."

George: "It looks like a very poor piece of ground."

Dennis: "It looks like it was planted."

George: "I don't like it. It looks planted and they planted too close together."

The facilitator explains the focus of the second progression of photos. Before starting the sustainability discussion, one participant noted the issue involved with timeframe of a

harvest. After a brief discussion, this participant stated that "Everything is sustainable with time."

PHOTO 1

Bill: "It may be overstocked."

George: "Because there is so much stocking material here, you could manage it in many different directions. You could manage for timber, you could manage for wildlife. . ."

Bill: "I would like to own that."

PHOTO 2

George: "In the near term, it doesn't look sustainable. I can't tell if there is regeneration there."

Dennis: "I think there is regeneration there."

Bill: "Looking in the back, all that is regeneration and some pretty nice trees. I think it probably is (sustainable). It was recently cut and that will put some sunlight on the forest floor."

Joanne: "It's hard to tell but I think there are conifers there. I like what is behind the conifers."

Lowenstein asked for clarification on overall sustainability and several participants responded overall sustainable.

PHOTO 3

Joanne: "No hope at all!"

Bill: "It depends on what you are trying to sustain. I'm going to go out on a limb here and say that it is (sustainable). I'm thinking they are doing one acre or two acre clearcuts and then doing another one acre clearcut. It looks like that has sustained itself. I'm going by over here (the adjacent stand). . . Again it looks like pretty good stuff to leave there (slash)."

Joanne: "Again, you would just leave that stuff there to protect it from the deer?"

There were several comments and a side discussion about Game Commission properties and clearcutting in terms of wildlife habitat improvement. The discussion began to focus on the focus of "sustainability." When the facilitator brought the discussion back to forest sustainability, most participants answered that the clearcut was not sustainable.

PHOTO 4

Lowenstein went back through some of the comments from the first photo progression.

Dave: "I don't think it is (sustainable) because I don't see any seed potential nearby."

Joanne: "No. It looks like someone goes in there with a lawnmower and mows the grass and around the trees."

PHOTO 5

Bill: "Now you are telling me that those are young trees and not ferns. . . then there is a lot of potential for a nice forest there. I like it. . ." *Several participants asked if the understory had fern before answering and expressed a dislike for fern.*

Dave: It looks like a lot of hemlock in there. Anything that regenerates besides ferns, I'm happy."

PHOTO 6

Debra: "I liked this. I think it is sustainable."

Bill: "Again, I think this comes back to what is sustainable. Are we talking about timber harvests? It doesn't look sustainable for timber harvests."

Lowenstein used the comment of "Easy to walk through" to refocus the discussion on how aesthetic features affect the functionality of the forest in the photo.

Bill: "If we are talking about from an overall ecology standpoint. . . not too good." *A small discussion started around timber stand improvement operations.* "This is not going to turn into a high quality hardwoods stand."

Dave (responding to a comment about the next stand): "Well, not in the first generation."

Several participants acknowledge the species as beech.

Bill: "This looks like an old field that was left go. If you did some TSI in here you could get something."

Joanne: "This is going to take a lot of work."

PHOTO 7

Joanne and Bill: "You might need to thin this out."

Bill: "Everything is nice and straight. You don't have much on the ground but it is the wrong time of the year to tell that. There's no midstory."

Mark: "Yeah, I like that."

Several participants indicate that overall they felt this photo showed a sustainable forest.

PHOTO 8

Debra: "The ground looks dead. It looks like poor soil. It just doesn't look right."

Jackie: "This one's going to take a while."

Joanne: "Don't you mean forever!?"

Mark: "There isn't a lot of seed source here."

Bill: "There might be some seed in the ground . . . It doesn't look sustainable without a lot of intervention. I mean you always could go in and plant trees."

PHOTO 9

Dennis: "It's coming back pretty good. Sustainablility and aesthetics don't necessarily agree."

Dave: "You could probably fix some of that if you have good regeneration on the ground. You could go in a cut some of the junk out of there."

Bill: "I can't tell what species it is."

PHOTO 10

Joanne: "I don't know where to start on this one."

Bill: "It just doesn't look sustainable. Looks like it was goats."

Several comments were made regarding timeframe and what the trees would look like in several years.

Jackie: "They all look the same (species)."

Bill: "I'll bet there will be a lot of blowdown trees."

Bill: "It looks like there is some regenerations. Maybe some stump sprouts. But it still isn't telling me why they left the stuff (trees) there."

Dennis: "I don't think that is very sustainable."

Joanne: "It just doesn't look like it could be sustainable to me. There is nothing going on down on the ground."

End of focus group and closing comments.

APPENDIX E

Informed Consent Form for Social Science Research
The Pennsylvania State University

Title of Project: **Forest Landowner's Perception of Forest Aesthetics and Sustainability**

Principal Investigator: **Daniel A. Lowenstein, M.S. Candidate**
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Other Investigator(s): **James C. Finley, Professor of Forest Resources**
302 Forest Resources Building
School of Forest Resources
Phone: (814) 863-0402
Email: fj4@psu.edu

A.E. Luloff, Professor of Rural Sociology

1. **Purpose of the Study:** The purpose of this study is to learn how private forest landowner (PFL) perceive forest management activities aesthetically relative to sustainability.

2. **Procedures to be followed:** You will be asked to participate in a discussion about aesthetic features and sustainability of various forest management practices. We will, with your permission, make an audio-recording of the discussion. Participants must be 18 years of age or older.

3. **Duration/Time:** The discussion will take about one hour and a half to two hours.

4. **Statement of Confidentiality:** Your participation in this research is confidential. The data will be stored and secured at 302 Forest Resources Building, University Park in password protected files. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared. To ensure group discussion confidentiality, the participants are asked not share any information pertaining to other participant's responses outside of the group.

   Although we will record the discussion, we will not put your name on the digital recording or transcript. The only information that will be on the audio recording or in our handwritten notes will be the date of the interview. Therefore, we do not believe that you can be identified. The interview material will be in password protected files and accessible only by the Principal Investigators. The files will be destroyed in 2012.

5. **Right to Ask Questions:** Please contact James Finley at (800) 235-9473 with questions or concerns about this study.

6. **Compensation for Participation:** Refreshments will be provided to participants during the facilitated discussion.

7. **Voluntary Participation:** Your decision to participate in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

You must be 18 years of age or older to consent to take part in this research study. If you agree to take part in this research study and the information outlined above, please sign your name and indicate the date below.

You will be given a copy of this form for your records.

☐ I **give** permission to be **AUDIO** taped.
☐ I **do give** permission for portions without personal identifiers of this interview to be directly quoted in publications/presentations.
☐ I **do not give** permission for portions of this interview to be directly quoted in publications/presentations.

_______________________________________ ___________________
Participant Signature Date

_______________________________________ ___________________
Person Obtaining Consent Date

- -

____
Participant's age

____
Number of forested acres owned

____
____
____
____
Please describe your experience or exposure to logging