

**TELEVISION, MASS MEDIA, AND ENVIRONMENTAL CULTIVATION:
A STUDY OF PRIVATE FOREST LANDOWNERS IN DELAWARE**

by

John George Petersen

A thesis submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Master of Arts in Communication

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ABSTRACT

The goal of this study was to survey private forest landowners in Delaware to extend previous studies into “environmental cultivation,” a research perspective that explores the theoretical link between television exposure and potential differences in the ecological worldviews of lighter versus heavier viewers. The study also sought to assess possible relationships between environmental attitudes and exposure to other mass media, as well as demographic, behavioral, and attitudinal variables.

Seven hundred and eighty-seven non-industrial private forest landowners – owners of at least one acre of forestland as determined by geographic information systems (GIS) analysis – completed questionnaires measuring media use, environmental concern, attitudes on government regulation, pro-environmental behavior, environmental communication, forest ownership objectives, and land management. In addition to demographics such as age, education, political orientation, income, location of forest, size of acreage, and length of ownership, a fictionalized narrative measure was included to assess the effectiveness of narratives in determining levels of environmental concern. Results indicated that weekly TV viewing was positively correlated with support for private property-related variables, and this was significant using both traditional and narrative measures. Perception of environmental media coverage was also correlated to other measures of environmental attitude.

INTRODUCTION

Communication about the environment – much of it through television and other media – plays a large role in shaping society’s attention, awareness and response to issues such as pollution, deforestation, and climate change (Hansen, 2011). Calling environmental communication a “crisis discipline” that should promote the well-being of both people and their planet, Cox (2007) observed that “our ideas, beliefs, attitudes, policies, and practices involving the natural world and environmental problems are mediated by systems of representation—by human communication” (p. 12).

Television is the dominant mass medium in the United States—roughly 289 million people watch an average of 33 hours per week, with several more hours spent viewing content on Internet or mobile devices (Nielsen, 2013). Since the 1960s, cultivation theory has become one of the most popular approaches to study the effect of television on its viewers’ attitudes and beliefs, including those on the environment (Bryan & Miron, 2004). But does spending more time in the ‘TV world’ influence how people view the ‘natural world’? That is the main question of *environmental cultivation*, which examines the link between long-term television exposure and differences in the ecological worldviews of its heavier and lighter viewers (Shanahan, 1993; Shanahan, Morgan, & Stenbjerre, 1997; Shanahan & McComas, 1999; Shrum, Burroughs, & Rindfleisch, 2003; Good, 2007, 2009; Dahlstrom & Scheufele, 2010).

Environmental cultivation predicts that those “with *less* overall television exposure tend to have more pro-environmental attitudes” (Besley & Shanahan, 2004, p. 8). This effect, termed “cultivation in reverse,” is based on the idea that “the thrust of television is anti-environmental, and so we would expect heavy viewers to manifest this anti-environmentalism more so than light viewers” (Shanahan, 1993, p. 187). As one study found, even self-identified environmentalists are susceptible to the corrosive influence of television viewing, because they “stand the most to lose by watching a lot of fictional television” (Good, 2009, p. 292). But with the exception of Good (2007; 2009), few studies have been connected to environmental populations; most have used either college students (Shanahan, 1993; Shanahan & McComas, 1999) or general population samples (Shanahan et al. 1997; Dahlstrom & Sheufele, 2010).

This study extends current research by focusing on a diverse population that controls a resource deemed vital to environmental quality: non-industrial private forestland (NIPF) owners. These owners, many of them families, collectively control over half the forest in the United States, with private ownership highest in the East — where land is considered at high risk of development (Butler, 2008; Kittredge, 2009). While many of the world’s environmental crises have been linked to forest loss as a result of human activity – such as land use and climate changes (Anderegg, Kane, & Anderegg, 2012; Gillis, 2011) – others have noted the ability of forests to mitigate these negative effects (Malmsheimer et al., 2008). Therefore it is both important and worthwhile to examine how television and other media might shape NIPF owners’ perceptions and behaviors toward the environment in general, and forests in particular.

Chapter 1

CULTIVATION OF ENVIRONMENTAL ATTITUDES

The environment that sustains the most distinctive aspects of human existence is the environment of symbols. We learn, share, and act upon meanings from that environment (Gerbner and Gross, 1976, p.173)

Background of Cultivation Theory

Cultivation theory conceptualizes television as “a centralized system of storytelling” that tells “most of the stories to most of the people most of the time” (Gerbner, Gross, Morgan, & Signorielli, 1986, p. 18). Unlike the distant past, when human knowledge and culture were shaped by direct experience or from stories shared by others, Gerbner (1967) believed that “much of our experience is in a new type of cultural environment” (p. 42) where most of what people know about the world comes from the flickering images and sounds emanating from their nearby television screen:

Television viewing cultivates ways of seeing the world—those who spend more time ‘living’ in the world of television are more likely to see the ‘real world’ in terms of the images, values, portrayals, and ideologies that emerge through the lens of television. (Morgan, Shanahan, & Signorielli, 2009, p. 35).

Unlike previous theories of direct effects, persuasion, or propaganda, cultivation sees television’s influence as a “continual, dynamic, ongoing process of interaction among messages and contexts” (Signorielli & Morgan, 2008, p. 112).

Metaphorically, cultivation blends images of industry and agriculture: Gerbner (1998)

described television as “the industrialization of storytelling” (p. 176), while Morgan and Shanahan (1999) wrote that “deeply held cultural perspectives and assumptions will not be efficiently nurtured (or gradually – even glacially – shifted) as a result of a single one-shot message blast, much as an unwatered or unweeded crop will do poorly... cultivation is an agro-aquatic metaphor for the function of television in the construction and maintenance of cultural meaning” (p. 12).

The cultivation research method consists of three main parts: (1) institutional process analysis – which looks at media organizations, power, and policy; (2) message system analysis – which examines week-long samples of prime-time TV content to note the recurrence of stable themes and images, and; (3) cultivation analysis – which uses standard survey methods on various populations to determine relative levels of television exposure, assess dependent variables of interest, and then correlate these measures with previous content studies using a variety of statistical techniques and controls (Gerbner, Gross, Morgan, Signorielli, & Shanahan, 2002). The process is designed to gauge whether television viewing, by itself or in combination with demographic or other factors, can be linked to differences in the attitudes or behaviors of its lighter and heavier viewers (Gerbner et al., 1986; Signorielli & Morgan, 2008).

Cultivation researchers use total amount of viewership as the independent variable because TV content is seen as a “*system* of messages, made up of aggregate and repetitive patterns of images and representations to which entire communities are exposed—and which they absorb—over long periods of time” (Signorielli & Morgan, 2008, p. 106). But while proponents do not minimize “the importance of specific

programs, selective attention and perception, specifically targeted communication, individual and group differences, and research on individual attitude and behavior change,” focusing on these factors overlooks “what is most distinctive and significant about television as the common storyteller of our age” (Gerbner et al., 2002, p. 44).

Mainstreaming is an important concept in cultivation, one which describes the ability of television to promote convergence in viewer attitudes by eroding or overriding differences that might derive from demographics or other characteristics:

Cultivation is not conceived as a unidirectional but rather more like a gravitational process. The angle and direction of the ‘pull’ depends on where groups of viewers and their styles of life are with reference to the line of gravity, or the ‘mainstream’ of the world of television. Each group may strain in a different direction, but all groups are affected by the same central current (Gerbner, 1998, p. 180).

On a practical level, mainstreaming effects might lead conservative viewers to be more moderate or liberals to be more conservative, depending on relative exposure.

Many studies have found television “makes a small but consistent contribution to viewers’ beliefs and perspectives” (Morgan & Shanahan, 2010, p. 340). But while critics point out that cultivation’s overall effect is often relatively modest – in the range of .10 using the Pearson correlation coefficient – cultivation theorists maintain that “what some critics belittle as ‘small effects’ may have significant repercussions”:

It takes but a few degrees shift in the average temperature to have an ice age or global warming. ... A single percentage point ratings difference is worth many millions of dollars in advertising revenue – as the media know only too well. Thus, a slight but pervasive (e.g. generational) shift in the cultivation of common perspectives may alter the balance of social and political decision making (Gerbner et al., 2002, p. 50).

Theoretical Models of Cultivation Effects

Cultivation maintains that television's distorted portrayal of reality leads its heavier viewers to give estimates of social reality (i.e., the "television answer") that reflect this biased TV worldview (Gerbner et al., 1986). Hawkins and Pingree (1980) wrote that cultivation "has the joint disadvantages for theory testing of being both global and subtle" because "characteristics of television content hypothesized to be important are meanings present only *implicitly*, and only *cumulatively* across the sum total of all television messages" (p. 218). Others found TV's correlation to dependent variables often became insignificant when "examined in the presence of variables introduced to control for spuriousness such as age, gender, ethnic background, education, newspaper reading and experience as a victim" (Potter, 1998, p. 930).

For years, the lack of a sufficient explanatory mechanism or psychological model for cultivation led some to wonder whether "differences in real-world beliefs across levels of viewing are truly due to television viewing and not some unmeasured third variable" (Shrum, 1996, p. 483). The search for possible intervening variables have either been television-related, such as perceived realism or specific genres, or audience-related, such as socioeconomic status, media literacy skills, or current events knowledge (Hawkins & Pingree, 1980). "Transportation," defined as "losing one's self in narrative," was studied on the basis that "stories are the central communicative unit in long-term cultivation effects" (Bilandzic & Buselle, 2008, pp. 508-509).

The most prominent theory for cultivation effects comes from work on social cognition led by Shrum (2002), who sought to overcome limits of research "concerned

with relations between input variables (e.g., media information and its characteristics) and output variables (e.g. attitudes, beliefs, and behavior) with little consideration of the cognitive processes that might mediate these relations” (pp. 69-70).

The cognitive processing approach departs from most media effects studies in that it focuses first on the judgments (i.e., the dependent variables) and how such judgments are constructed in general... Once these processes are delineated, propositions can then be constructed to account for how particular media content (i.e., the independent variable) influence the judgments (Shrum, 2001, p. 96).

Shrum’s approach builds on work by Tversky and Kahneman (1973) on the *availability heuristic*, defined as a “judgmental heuristic in which a person evaluates the frequency of classes or the probability of events by availability, i.e., by the ease with which relevant instances come to mind” (p. 207). The concept of *construct accessibility* holds that constructs will be more likely recalled based on their recency or frequency (O’Guinn & Shrum, 1993). Relatedly, media exemplification theory (Zillman, 2002) formed the basis for a study on *exemplar accessibility* that found that “media exposure increases the accessibility of exemplars that are a common component of media content” (Buselle & Shrum, 2003, p. 273).

Shrum (2002) theorized that people are likely to retrieve only that small subset of information sufficient to answer any matter at hand – with “sufficiency” linked to one’s “motivation and ability to process information” (p. 71) and also that people are most likely to retrieve only the “information that comes most readily to mind” – with “accessibility” related to how recent, frequent, or vivid it is (pp. 72-73). Accessibility is thought to be most important when people are asked to make judgments about

others, form attitudes or beliefs, or estimate the prevalence of some event or class of persons – the types of judgments common to media research studies (Shrum, 2002).

The *heuristic processing model of cultivation effects* rests on five premises: (1) TV exposure affects accessibility, (2) accessibility mediates cultivation effects, (3) television exemplars are used as a basis for judgments, (4) motivation to process information moderates the cultivation effect, and, (5) viewer ability to process information moderates the cultivation effect (Shrum, 2002, pp. 80-86). Cultivation is enhanced or reduced depending on the presence or absence of these factors, which reflect the use of heuristic processing, “a minimum of cognitive effort,” or systematic processing, used when “recipients perceive that it is important to formulate a highly accurate or veridical opinion judgment” (Chaiken, 1980, pp. 753-754). Concerning research methodology, Shrum (2007) found phone surveys (heuristic processing) were more likely to produce cultivation effects than mail surveys (systematic processing).

Environmental Cultivation Research

Originally focused on television’s portrayal of violence and the incidence and perception of real-world violence, cultivation research has broadened to encompass a wide range of topics, including “sex roles, aging, political orientations, the family, environmental attitudes, science, health, religion, minorities, occupations, and others” (Shanahan & Morgan, 1999, p. 4). Cultivation now “measures television exposure in individuals and attempts to associate that measurement with attitudes about any dependent variable of concern” (Shanahan & McComas, 1999, p. 117).

Several previous studies have examined mass media use and environmental attitudes. Novic and Sandman (1974) found that, compared to lighter users, “heavier media users considered themselves less informed on environmental issues, viewed the issues as less serious, and preferred less personal solutions to them” (p. 450). Ostman and Parker (1987) found a correlation between education levels and respondents’ use of media sources, such that “as education increased, (1) use of television for environmental information decreased, [and also that] (2) television was generally rejected as a believable source of environmental scientific information” (p. 16). In a study that blended the uses-and-gratifications perspective with cultivation theory, Holbert, Kwak, and Shah (2003) found that levels of environmental concern and certain demographics predicted both pro-environmental behavior and viewership of specific program genres. By examining the link between television exposure and environmental beliefs, cultivation has also made important contributions to the study of environmental communication (Cox, 2013; Hansen, 2011).

One of the key parts of cultivation research is “message system analysis,” designed to gauge “the overall pattern of programming to which total communities are regularly exposed over long periods of time” (Gerbner, 1998, p. 179). To that end, a number of studies have attempted to assess the content of television’s environmental narrative. Shanahan (1993) found “most television is devoid of explicit environmental messages” and “one of the most typical messages of television entertainment is that there is, in fact, no environment as we know it...” (p. 185). Similarly, Shanahan & McComas (1999) noted that “the most noticeable thing about TV’s attention to the

environment is the extent to which the environment is ignored,” a phenomenon termed “symbolic annihilation” (p. 118). One explanation for this is a belief that nature and the environment are not compelling narrative themes for television. In an analysis of prime-time TV programming from 1991 to 1995, Shanahan and McComas (1997) found that “nature is completely absent as a theme in almost 80% of programming... [and] not only are nature themes less frequent, but they are separate from the dominant themes in prime time” (p. 152). A subsequent analysis of a six-year period of non-news entertainment and fictional programs found environmental themes not only appeared to be decreasing, but that “environmental issues have not been, nor do they seem to be becoming, frequent source material for television’s narratives” (McComas, Shanahan, & Butler, 2001, p. 539). The lack of sufficient content is one reason why environmental attitudes are seen as a special case of “cultivation in reverse,” similar to how the elderly are marginalized in both television programming and in viewer estimates of their prevalence in society:

Although many will disagree with the hypothesis that the effect of television on viewers’ attitudes and behaviors can be assessed solely as a function of viewing time, even more people may disagree with the hypothesis... [that] as viewing time increases, environmental concern will decrease. That is, television is an anti-environmental force (Shanahan, 1993, p. 186).

Much of the environmental cultivation literature has confirmed the “cultivation in reverse” hypothesis, including the Shanahan (1993) study in which three out of four college student samples showed that heavier viewership was linked to lower environmental concern. Interestingly however, results in a fourth group were attributed

to the possibility that “years of marginally increasing concern in television programming is having some impact” (Shanahan, 1993, p. 192). Also, the study found mainstreaming effects for politically active students, such that increased viewership was linked to responses “closer to the mainstream which television represents” (p. 194), which in this case was a lower level of environmental concern.

Shanahan et al. (1997) studied subjects’ willingness to make sacrifices for the environment, concern about pollution, and fear of technology. Mainstreaming again was found for some groups: a “more environmentally ‘friendly’ group – in this case, those more willing to sacrifice – who find themselves less willing to sacrifice as heavy viewers” (p. 316) and also “conservative, male, rural, and low-education heavy viewers who are more concerned than their light viewing counterparts. These are subgroups which tend to be less concerned overall, so there is some indication that television mainstreams viewers toward a slightly higher level of environmental ‘worry’” (p. 317).

Materialism and the Dominant Social Paradigm

Television’s virtual void of environmental content is believed to stem from its commercial and ideological underpinnings, a view strongly linked to the concept of the “dominant social paradigm” (DSP), which Pirages and Ehrlich (1974) defined as “a mental image of social reality that guides expectations in a society” (p. 43). As a “critical” media theory, cultivation sees television as controlled by “global commercial interests, who are largely unknown, unchosen and unelected, and who have little incentive to be interested in the content of their stories beyond their ability to attract specific, well-defined, profitable audiences” (Morgan & Shanahan, 1999, pp. 13-14).

Due to its corporate ownership and economic motivations, television content is thought to highlight those values that emphasize technological advancement and material progress because they uphold the current economic and social system (Shanahan, 1993; Shanahan et al., 1997). Oriented to a pro-growth consumer culture, it follows that “prime-time television programming is ‘apathetic’ to environmental concerns, relative to other issues which command far more notice” (Shanahan et al., 1997, p. 312). Carlson (1993) also concluded that “television viewing seems to have a relatively strong influence on support for capitalist values” (p. 249).

The belief that a “new environmental paradigm” has emerged to challenge the old DSP gave rise to the New Environmental Paradigm Scale (NEP), one of the most widely used measures of environmental concern (Dunlap, 2008). The NEP places an individual’s beliefs on a continuum between pro-environmental values (NEP) on one side and the values of the DSP on the other, which represent “belief in abundance and progress, our devotion to growth and prosperity, our faith in science and technology, and our commitment to a laissez-faire economy, limited governmental planning and private property rights” (Dunlap & Van Liere, 1978, p. 19). The NEP holds that widespread acceptance of DSP values is a major cause of environmental degradation.

As a 15-item revision of Dunlap and Van Liere’s (1978) original 12-item scale, the *New Ecological Paradigm Scale* was designed to tap five aspects of environmental belief: (1) “reality of limits to growth”, (2) anti-anthropocentrism,” (3) “fragility of nature’s balance,” (4) “rejection of exemptionalism,” and the (5) “possibility of an eco-crisis” (Dunlap, Van Liere, Mertig & Jones, 2000, p. 433) Studies on both the new

and old versions of the NEP have found that each correlates significantly with variables such as attitudes toward government regulation, private property rights, and measures of pro-environmental behavior (Cordano, Welcomer, & Scherer, 2003).

In environmental cultivation, the NEP has been used as a dependent variable to correlate with aggregate TV viewing, along with demographic or other factors. However, Van Liere et al. (2000) found the NEP also correlated with political party (Democrats scored higher), past residence (urbanites scored higher), income (negatively correlated), and occupation. Others have cited studies that the NEP lost its predictive power when considered against standard demographics (Dutcher, Finley, Luloff, & Johnson, 2007).

The link between television exposure and levels of materialism has been confirmed by several studies, consistent with the basic tenets of the DSP (Shrum, Burroughs, & Reindfleisch, 2005; Good, 2007, 2009). In a study on TV viewing, environmental attitudes, and materialism among environmentalists and the general public, Good (2007) found heavier viewership was linked with lower environmental concern for the entire sample, but was significant only for the environmentalist group when analyzed separately. The study concluded that “materialism fully mediates the relationship between television and environmental attitudes” (p. 376), but it also cautioned that “a variable that has not been controlled for (e.g., political affiliation) could explain the relationships found in this study (i.e., perhaps liberals watch less television, are less materialistic, and are more ‘environmentally friendly’ than conservatives)” (p. 379).

In a follow-up study, Good (2009) examined environmental cultivation in the context of program type (non-fiction vs. fiction), viewers' need for cognition (NFC), and attention to television – the last two variables linked to cultivation in the heuristic processing model of cultivation effects (Buselle & Shrum, 2003). Environmentalists who were heavier TV viewers scored lower on the NEP Scale and held views closer to the public than those of lighter-viewing environmentalists (a 'mainstreaming' effect toward lower levels of the concern spectrum). Also, viewers with higher need for cognition (NFC) who paid more attention to TV had lower NEP scores. Program type was significant: if non-fiction program viewing was the independent variable, then heavier viewers had *higher* NEP scores, but there was no effect for NFC or attention. As in the previous study, *materialism* was the significant mediating variable. In summary, Good (2009) assessed the effects of entertainment television on environmentalists:

As environmentalists watch fictional television, the belief system that differentiated them from the general public is affected and eroded... they become less concerned about the environment, and, as such, their attitudes become more like the attitudes of the general public (p. 290).

In a departure from previous research, Dahlstrom & Scheufele (2010) theorized that, even though the environment was less than two percent of prime-time TV's content, it nonetheless emphasized "risks and problems when the environment was mentioned" (p. 58). On this basis, their study found *more* television exposure and greater *exposure diversity* was linked to *more* environmental concern, based on the idea that lighter viewers get information from a variety of sources and are therefore more likely to hold social conceptions closer to objective reality (Gerbner et al., 2002).

Hypotheses and Research Questions

Environmental Cultivation: Based on the previous theoretical framework concerning television exposure, environmental attitudes, and the “dominant social paradigm,” the following hypotheses are proposed for the sample of non-industrial private forest landowners:

- H1: Higher levels of television exposure will be negatively correlated with levels of environmental concern (“cultivation in reverse”).
- H2: Higher levels of television exposure will be negatively correlated with support for government regulation to protect the environment (“cultivation in reverse”).
- H3: Higher levels of television exposure will be positively correlated with support for free enterprise and capitalist values, such as a belief that government regulations to protect the environment are bad for the economy.
- H4: Higher levels of television exposure will be positively correlated with support for private property rights.
- H5: Higher levels of television exposure will be negatively correlated with measures of pro-environmental behavior (“cultivation in reverse”).

Television is the main focus of cultivation studies because it is thought to be the “dominant storyteller” in society, however, it is also important to examine how other mass media might shape the attitudes of private forest landowners toward the environment. Therefore, the following research question is proposed:

- RQ1: What is the relationship between exposure to other mass media – newspapers, radio, and the Internet – and environmental attitudes?

In light of the study by Dahlstrom & Sheufele (2010) concerning exposure diversity and the finding that TV coverage tends to emphasize “risks and problems” when environmental issues are mentioned, it should be useful to explore the extent to which audiences perceive that television highlights environmental issues at all (does it cover them too much?) or the extent to which TV emphasizes “risks and problems” (is TV too negative?). Therefore, the following research question is proposed:

RQ2: What is the relationship between audience perceptions of TV coverage of environmental issues and their environmental attitudes?

Environmental Narratives: The concept of narratives, or stories, is a central component of cultivation theory. In *Nature Stories: Depictions of the Environment and their Effects*, Shanahan and McComas (1999) offered a compelling rationale for the use of narratives to study environmental issues:

Ozone holes, population issues, chemical pollution, resource depletion, land conservation, wildlife preservation, and virtually any environmental issue are understood by mass audiences in relatively small ways, mostly through environmental narratives.

The environmental stories we choose to believe will generally be those of the most utility... At some level, what we think and say about the environment really becomes more important than the environment itself, in the sense that what objectively happens in the world... is a function of which ideology wins the battle. The human technology for disseminating ideology is narrative (pp. 6-8).

According to Gerbner (1999), stories have three functions: “(1) to reveal how things work; (2) to describe what things are; and (3) to tell us what to do about them”

(p. ix). Signorielli and Morgan (2008) wrote that “storytelling is central to the theory of cultivation,” but maintained that television had turned “storytelling into a centralized, standardized, market-driven, advertiser-sponsored system” (p. 107). Morgan and Shanahan (1999) described cultivation as “a theory of narrative’s role in culture” because stories “reflect and cultivate its most basic and fundamental assumptions, ideologies and values” (p. 13). In a study of newspaper coverage of climate change, McComas & Shanahan (1999) investigated how narratives both constructed environmental issues in the media and also contributed to the often cyclical nature of the media’s environmental news coverage: “One of the jobs of narrative is to frame issues as having beginnings, middles, and ends in a generally one-directional temporal fashion” (p. 32). But if environmental issues were built by message producers and then internalized by audiences through narrative frameworks, then an even more intriguing question became a theoretical possibility: what if narratives were used as a way to *measure* environmental attitudes and beliefs?

In a pioneering exploratory study, Shanahan, Pelstring and McComas (1999) examined the usefulness of “narrative” constructs to assess environmental beliefs, theorizing that while the NEP can capture various dimensions of environmental thinking, many people best conceptualize complex and context-dependent issues in the form of stories. Shanahan et al.’s (1999) study constructed a hypothetical scenario in which various “stakeholders” such as real estate developers, landowners, government agencies, preservation organizations, and environmental conservation groups interacted within a story that had several possible outcomes – each of which involved

one or more of the actors emerging as a “winner” or “loser.” Using statistical techniques such as factor analysis, the study found significant correlations between five possible story “endings” and the various dimensions of environmental belief as measured by the NEP.

Private forest landowners, especially in an East Coast state such as Delaware, could present an ideal population to examine the ability of narratives to assess the interaction between land development pressures, the desire to preserve natural resources, and the rights of property owners to pursue individual ownership objectives. Development, in particular, has been singled out as one of the most important issues facing policymakers who wish to reduce forest fragmentation, preserve wildlife habitat, and promote cleaner air and water. In the article “Fire in the East,” Kittredge (2009) attempted to contrast the general public and the mass media’s preoccupation with the loss of thousands of acres due to massive forest fires in the West with the often unnoticed – and yet, permanent – loss of forestland in the East to land use conversion:

As all foresters know, forests grow back... Another disturbance exists in the eastern United States that does not grab headlines, and yet permanently impacts the landscape. Forests do not grow back after development. Development fragments forests that remain reducing their ability to provide habitat, recreation, and timber. Private family ownerships continue to get smaller through parcelization and isolated in an increasingly fragmented landscape, which impairs their ability to provide the full range of benefits... This “fire in the East” continues to “burn” and acres of forestland are permanently lost (p. 162).

Forest fragmentation diminishes many of the benefits that large blocks of forest provide, and current trends indicate that woodlot size is decreasing while the overall number of private owners is increasing (Ricci, Demers & Long, 2010). Private ownership is largely an East vs. West issue: European settlement patterns have left roughly 83 percent of forestland in the East under private ownership, while the opposite is true in the West, where roughly two of every three forested acres is owned by the government (Butler and Leatherberry, 2004). Despite its small land area, Delaware ranks among the states with the highest percentage of forestland in private ownership—roughly 9 out of 10 acres of forest land is held privately (Butler, 2008).

This study will examine Delaware’s non-industrial private forest landowners in an attempt to replicate the previous study by Shanahan et al. (1999), specifically with regard to the environmental “story” and the possible “story outcomes” (see Appendix E). If, as the previous study by Shanahan et al. (1999) suggested, narrative measures can accurately assess dimensions of environmental belief, then it should follow that these measures should also correlate with the hypothesized relationship between television viewership, private property rights, government regulation, and support for free enterprise. Therefore the following hypotheses are proposed:

- H6a: Narrative “outcomes” will correlate with other measures of environmental attitude, belief, and behavior, such as the NEP, government regulation, and pro-environmental behavior.
- H6b: Television viewing will be negatively correlated with narrative measures of environmental concern, such as outcomes favoring land use preservation and environmental groups (“cultivation in reverse”).

H6c: Television exposure will be positively correlated with narrative measures that reflect support for the values of the “dominant social paradigm,” such as unrestricted land development and free enterprise.

As mentioned previously, cultivation theory is unclear on the relationships between environmental attitudes and exposure to other mass media. Therefore, the following research question is proposed:

RQ3: What is the relationship between other mass media exposure – radio, newspapers, and the Internet – and narrative measures of environmental concern?

Forest Ownership Objectives: Adopting a biosocial perspective, Backes (1995) argued that the main link between humans and the natural world around them is one based on functional value:

A biophysical object is not a natural resource until it is valued by somebody. This means that one object can be more than one resource. A tree, for example, can be valued for its wood, for its beauty, for memories associated with it, or for a number of other reasons. These values and related behaviors link the social and biophysical systems (p. 149).

Forests are a fitting example of the biosocial perspective because they constitute a vital link in the chain of environmental quality, yet they also represent different things to various stakeholders. In the United States, more than half of all forestland (56 percent – equal to about 432 million acres) is in the hands of an estimated 11 million private owners (Butler, 2008). But while this ownership group includes a mixture of timber industry companies, business partnerships, and non-

public entities, an overwhelming 92 percent (around 10.3 million) are family forest owners who own over one-third (264 million acres) of the nation's total forest acreage (Butler, 2008).

Scientists see the forests of the Eastern United States as especially crucial: their growth serves as an important buffer against rising temperatures and climate change caused by increased atmospheric carbon, but forests are restrained by the pressing need for agricultural land and increasing development (Gillis, 2011). In the Chesapeake Bay Watershed, which covers all or part of six states – including Delaware – forests once comprised 95 percent of the land area but now only 55 percent, and experts have estimated that “forests are lost to development at a rate of 100 acres per day” (U.S. Forest Service, 2012).

Many public agencies and non-governmental groups encourage forest owners to adopt or implement some form of professional management strategy for their forestland, operating on the premise that “a healthy forest is a managed forest,” and that owners are best suited to chart the future course of their forest based on their individual ownership motivations. Chief among these is the U.S. Forest Service's Forest Stewardship Program, which provides a range of financial and technical resources to foster “the development of comprehensive, multi-resource management plans that provide landowners with the information they need to manage their forests for a variety of products and services” (U.S. Forest Service, 2013).

Salmon, Brunson and Kuhns (2010) differentiated between “amenity-focused,” “multiple benefit,” and “passive” owners on the premise that “segmentation according

to the benefits desired from a product is the most practical way to understand an audience” (p. 420). Using a “social marketing approach,” Butler et al. (2007) assessed landowners’ favorability toward forest stewardship programs and their level of engagement in land management. The analysis yielded four groups: “model owners” (favorable to both); “prime prospects” (favorable to stewardship, unengaged in management); “potential defectors” (unfavorable to stewardship, engaged in land management); and, the “write-offs” (unfavorable to both). Model owners were said to be actively engaged in making good land stewardship decisions and show a strong inclination for continuing to do so,” while write-offs “are not performing the desired behaviors and they do not show much interest in doing so” (p. 354).

The link between various ownership objectives and environmental attitudes and beliefs is not entirely clear. While it would make sense that those landowners with values that include a “cleaner environment” would have higher scores on a scale such as the NEP, this fact remains to be seen. Therefore, this research question is proposed:

RQ4: What is the relationship between forest ownership objectives – such as timber income, wildlife habitat, investment, cleaner environment, etc. – and measures of environmental attitude, such as the NEP?

Environmental Communication: Many forest policy experts believe the key to influencing landowners is chiefly a challenge of communication, in line with strategies that call for “greater knowledge and understanding of the attitudes and communication behavior of environmental publics” (Major, 1993, p. 252). Because

the benefits of forest planning are often seen as self-evident, a principal goal has been to identify owner characteristics that will lead to methods for communicating benefits in a way that produces desired behavioral changes:

An improved understanding of owner attitudes may result in programs or messages that have greater appeal to the majority of owners who have yet to engage in more traditional forms of management. Improved programs can better protect private forestland, encourage responsible management, and ensure the provision of public benefits (Belin et al., 2005, p. 28).

Butler and Leatherberry (2004) called for “innovative and sophisticated methods of communicating with forest landowners” because “new owners likely will have different backgrounds and ownership objectives and be less aware of the potential benefits of good forest management than previous owners” (p. 9). However, one study lamented that “we know little of the relative efficacy and feasibility of different communication means for educating diverse land resource decision-makers about new practices and possibilities for achieving personal, community, and societal objectives” (Schelhas, Zabawa, and Molnar, 2003, p. 62). As noted earlier, Kittredge (2009) was most concerned about the problem of land use conversion:

In the 21st century as our eastern forests disappear, we need to better understand how to effectively reach woodland owners with conservation messages like the sale or donation of easements to permanently protect land from development. In times of decreasing public budgets, can these messages be better conveyed through peer-to-peer networks? (p. 162).

One theoretical dimension that can be explored in this study is the extent to which forest landowners believe *environmental communication* itself is important. This can be measured by the somewhat new Environmental Communication Scale (ECS), developed by Kassing, Johnson, Kloeber, and Wentzel (2010) to “measure the degree to which people actually engage in environmental communication”:

The ECS is a 20-item measure that assesses environmental communication along three dimensions: practicing, dismissing, or confirming. Practicing and dismissing environmental communication dimensions assess the degree to which people engage in or avoid conversations and media reports about environmental issues. The confirming dimension taps people’s attitudes regarding the importance and necessity of engaging in environmental communication. (p. 1)

Due to its recent introduction, the ECS’ predictive value and validity have been questioned. Cantrill (2010) thought of it as “embracing of green discourse” and “shunning brown, pro-developmental, or consumerist forms” and urged caution about drawing conclusions if scholars were to “collectively assume environmental communication preferences one world view over another” (pp. 26-27). Even Kassing et al. (2010) speculated if the test itself was too “generic,” in light of the “multiplicity and diversity of environmental issues that have emerged over the last decade” (p. 17). The following research questions are therefore proposed for this study:

RQ5: What is the relationship between the ECS and measures of environmental concern, such as the NEP, government regulation, and support for property rights?

RQ6: What is the relationship between the ECS and various forms of media use, such as television, radio, newspapers, and the Internet?

Chapter 2

METHOD

This project was sponsored by a U.S. Forest Service Forest Stewardship Program grant, which underwrote the costs of printing, mailing and prepaid reply envelopes. The Delaware Department of Agriculture Forest Service provided geographic information systems (GIS) technology to identify participants as well as additional staff and technical assistance in the ongoing collection of the survey data.

Participants

Participants were private forest landowners who resided in Kent County or Sussex County, Delaware. New Castle, the state's most populated and developed county, was not included. GIS software that linked forest cover data to county tax parcel information produced a list of individuals owning at least one acre of forest, (business, nonprofit, and public entities were excluded), from which a mailing list was generated by nth selection sampling. In Sussex County only, all those with at least 50 acres of forest were included in hopes of ensuring representation of large landholders. Surveys could be completed on the Internet or by prepaid reply envelope (eight were done electronically). About 3,000 cover letters (Appendix A) and questionnaires (Appendix B) were mailed in mid-2011.

Final sample size was $n = 787$, a 25.9 percent response rate much higher than the estimated 4.4 percent direct mail rate (Schiff, 2012), which might have reflected

influence of sponsorship or topic saliency (Yammarino, Skinner, & Childers, 1991). 73.1 percent of respondents were male ($n = 568$) and 26.9 percent were female ($n = 209$). Ages ranged from 24 to 97 years old ($n = 768$, $M = 62.22$, $SD = 13.14$).

Procedures

Participants completed a 52-item questionnaire on media use (television, radio, newspapers, and Internet), environmental concern, private property rights, government regulation, perception of media coverage of environmental issues, importance of environmental communication, and pro-environmental behavior. Also included were 18 forestry-related questions: (a) forest ownership – acreage, method of acquisition, and length of ownership; (b) forest management behavior– including past timber harvesting; (c) interest in forest planning and desire to receive information on it; and, (d) main reasons for owning forestland. Standard demographics were also included: age, gender, area of residence (urban, suburban, or rural), education, political orientation, and income. Lastly, participants read a hypothetical short “narrative” scenario (Shanahan et al., 1999) about a family’s desire to sell its dairy farm, which includes forestland, followed by a list of five “outcomes.” Respondents were asked to assign a forced rank on each outcome from 1 = “best” to 5 = “worst” outcome.

Despite GIS analysis indicating that all participants owned at least one acre of forest, 94.3 percent of the 787 respondents ($n = 739$) responded “yes” to the question “Do you own forestland?” while the remainder answered “no” ($n = 45$) or did not answer ($n = 3$). Because the additional 5.7 percent yielded valuable data on the

theoretical relationship between media use, environmental attitudes, and other variables, the decision was made to include them in the study for further analysis.

Measures (Appendix B)

Television viewership: Television viewership was assessed by two questions that asked participants to estimate the amount of television, in hours, they watched on an “average weekday” and on an “average weekend day.” This method of measuring the independent variable of television exposure is consistent with previous cultivation research (see Rubin, Perse, & Taylor, 1988).

The two questions on television viewing were multiplied (five times the “weekday” response and two times the “weekend” response) and then added to create an interval variable of total weekly TV viewing ($n = 760$, $M = 19.89$, $SD = 13.99$).

Other Media Use: Similar to television viewership, participants were asked to estimate the amount of time spent, in hours, on each medium “on an average day” with all measures subsequently multiplied by seven to create a weekly measure of use: one question on newspaper reading ($n = 763$, $M = 4.57$, $SD = 4.32$); one question on radio listening ($n = 769$, $M = 12.49$, $SD = 14.61$); and two questions on Internet use: one on Internet use for “news/information” ($n = 768$, $M = 6.96$, $SD = 10.93$) and the other on Internet use to “stay in touch with friends/relatives” ($n = 761$, $M = 3.72$, $SD = 7.33$).

Environmental Concern: An 8-item shortened version of the revised New Ecological Paradigm (NEP) Scale (Dunlap et al., 2000) was used to measure environmental concern. The scale consisted of eight statements such as “The balance of nature is very delicate and easily upset” (coded normally) or “Humans have the

right to modify nature to suit their needs” (reverse coded) on which respondents were asked to indicate their level of agreement on a 5-point scale (1 = Strongly Disagree to 5 = Strongly Agree) (see Appendix C). Responses were used to construct a summative scale, with possible scores ranging from 8 to 40. Together, the NEP Scale items produced a group mean of 27.30 ($n = 749$, $M = 27.30$, $SD = 6.69$) with a high degree of reliability in the current study, $\alpha = .83$.

As one of the most widely-used measure of environmental beliefs, values, and attitudes, the NEP is designed to measure a person’s beliefs on a continuum between either an anthropocentric (human-centered) or ecologically-friendly worldview (Dunlap et al., 2000) and has been employed in hundreds of studies over the past several decades, including environmental cultivation studies (e.g. Good, 2007) and forest landowner research (Cordell & Tarrant, 2002).

Private Property Rights: Support for private property rights was assessed by two questions that measured level of agreement on a 5-point Likert Scale (where “1 = Strongly Disagree” and “5 = Strongly Agree”) with the following statements: “Private property owners should be able to do anything they want with their land” and “What an individual property owner does with his or her land does NOT have a major effect on the region.” The first statement is grounded in previous literature on environmental concern (Dunlap & Van Liere, 1978; Cordano & Frieze, 2002; Cordano et al., 2003). Private property rights are an important correlate of environmental concern, consistent with research by Dunlap and Van Liere (1980), who found that “support for private property rights, laissez-faire government, and economic growth to be strongly

correlated with environmental concern and to explain far more variation in the latter than demographic variables” (p. 194). The second statement is rooted in previous literature on forest landowners in which researchers attempt to gauge “landscape perspective,” which is defined as “owner’s attitudes toward management at spatial scales larger than the individual parcel” (Belin et al., 2005, p. 29). Taken together, responses to the two statements produced a Cronbach’s alpha of .55 – not sufficiently high enough to allow them to be treated as a single construct. For analysis, the single statement about owners’ ability to “do anything they want” will be used to represent attitudes toward “property rights” and the second statement will be used to gauge owner attitudes toward what might be appropriately termed “property effects.”

Government Regulation: Support for government regulation to protect the environment is an attitudinal variable that past research shows is strongly correlated with measures of environmental concern, such as the NEP (Dunlap & Van Liere, 1978; Cordano et al., 2003). This is because “the public sees government as having primary responsibility for environmental protection and is somewhat skeptical of the efficacy of efforts by individuals in the absence of government regulations” (Dunlap & Scarce, 1991, p. 655). Support for government regulation was assessed by level of agreement on a 5-point scale (“1 = Strongly Disagree” to “5 = Strongly Agree”) with two statements: “The government must regulate air, soil, and water quality in order to protect nature” and “Government regulations concerning nature usually destroy businesses and kill jobs.” Together, the two responses were insufficiently reliable, $\alpha = .55$, to be considered a single construct; thus they were treated separately in analyses.

Land Ownership Objectives: Land ownership objectives were assessed through a single multiple-selection question that asked landowners to indicate “What are your *main* reasons for owning forestland? (Please select all that apply).” Choices were: Investment, Scenery, Privacy, Recreation, Cleaner environment, Family legacy, Timber income, Wildlife habitat, and Hunting. Research has shown that forest landowners have multiple reasons for owning forest and that many owners pursue both economic and non-economic objectives. It was theorized that economic ownership objectives such as “timber income” would correlate with lower environmental concern because these are the values more closely aligned with the ideology of the “dominant social paradigm.” Conversely, non-economic ownership objectives such as “cleaner environment” would correlate with higher environmental concern. The ownership objectives selected by the greatest number of respondents were (in order): Privacy, 53.9 percent (n = 424); Wildlife habitat, 53.5 percent (n = 421); Scenery, 38.4 percent (n = 302); Hunting, 37.1 percent (n = 292); Family legacy, 33.9 percent (n = 267); Cleaner environment, 28.3 percent (n = 223); Investment, 23.5 percent (n = 185); Recreation, 22.4 percent (n = 176); and Timber income, 10.4 percent (n = 82).

Perception of Media Coverage of Environmental Issues: On a 5-point scale (“1 = Strongly Disagree” to “5 = Strongly Agree”), respondents indicated level of agreement with two statements measuring their perception of media coverage of environmental issues: “News stories in the media about nature topics are usually very negative” and “Overall, the news media covers stories about natural resources far too much”. The two statements produced a minimally acceptable Cronbach’s alpha of .60.

Environmental Communication: The “confirming subscale” of the Environmental Communication Scale, or ECS (Kassing et al., 2010), was used to assess respondents’ attitudes toward the importance of communicating about nature and environmental issues (Appendix D). On a 5-point scale (“1 = Strongly Disagree” to “5 = Strongly Agree”), participants indicated their agreement with five statements such as “Conversations about natural resource issues can make a difference” and “Talking about nature is important to our future”. The scale achieved very high reliability in the current study, $\alpha = .90$.

Pro-Environmental Behavior: Consistent with previous studies by Cordano et al. (2003), current and past behavior with respect to environmental issues was measured by two questions: “Have you ever donated money to an environmental group?” and “Do you recycle on a regular basis?” On the donation question, 42.6 percent ($n = 329$) answered “yes,” and 57.4 percent ($n = 444$) responded “no.” On the recycling question, a much higher number – 81.1 percent ($n = 630$) – answered “yes” while 19.9 percent ($n = 147$) answered “no.” Even when recoded to create a 4-point summative scale, the two questions were not sufficiently correlated to allow for meaningful analysis. However, the two questions on pro-environmental behavior each provided a meaningful categorical variable to correlate with other measures of environmental belief, such as the NEP or the ECS, as well as weekly TV exposure.

Demographic Factors: Prior research indicates a number of demographic factors are linked to environmental concern, such as age (negatively correlated), education and income (positively correlated), political orientation (liberals more

concerned than conservatives), and residence (urban residents more concerned than rural), while the effect of gender is less clear (Dunlap & Van Liere, 1980). However, Corbett (2006) reported on a 10-year comparison study that indicated that “women report stronger environmental attitudes and behaviors than men” (p. 62).

As noted previously, 73.1 percent of the total respondents were male ($n = 568$) and 26.9 percent were female ($n = 209$). Age was calculated from the question: “What year were you born?” with respondent ages ranging from 24 to 97 years old ($n = 768$, $M = 62.22$, $SD = 13.13$). Education was measured by five categories: “High school or less” ($n = 237$, 30.7 percent); “Some college or tech. school” ($n = 209$, 27.1 percent); Associate degree ($n = 69$, 8.9 percent); “Bachelor degree” ($n = 125$, 16.2 percent); or “Post-graduate degree” ($n = 132$, 17.1 percent). Political orientation was one of the following five categories: “Very conservative” ($n = 160$, 21.1 percent); “Somewhat conservative” ($n = 262$, 34.6 percent); “Moderate” ($n = 250$, 33 percent); “Somewhat liberal” ($n = 67$, 8.8 percent); or “Very liberal” ($n = 19$, 2.5 percent). Only 11.3 percent of the sample identify as liberal, with over half – 55.7 percent – identifying as conservative, and a third (33 percent) as moderate. Income was “Under \$25,000” ($n = 61$, 8.1 percent); “\$25,000 to \$49,999” ($n = 154$, 20.3 percent); “\$50,000 to \$99,999” ($n = 189$, 25.0 percent); “Over \$100,000” ($n = 142$, 18.8 percent). The largest block was reserved for “Prefer not to answer” ($n = 211$, 27.9 percent).

The study also sought to capture factors associated with forest ownership: 70 percent responded “Purchase” ($n = 527$) on the question “How did you acquire your forestland?” while 23.2 percent answered “Inheritance” ($n = 175$) and 1.3 percent

responded “Do not own” ($n = 10$). An additional 4.5 percent indicated “Both purchase and inheritance” ($n = 34$). On the question of forestland size, 36.4 percent indicated from “1 to 10 acres” ($n = 271$); 45.5 percent from “10 to 50 acres” ($n = 339$); 11.9 percent from “50 to 100 acres” ($n = 89$); 5.9 percent from “100 to 500 acres” ($n = 44$); and only .3 percent reported owning “More than 500 acres” ($n = 2$). On the issue of length of ownership (measured by the question: “How long have you owned your forestland?”), an overwhelming number of respondents at 42.1 percent ($n = 318$), indicated “More than 20 years,” while the smallest number indicated 9.7 percent “Less than 5 years” ($n = 73$). Another 18.1 percent responded “5 to 10 years” ($n = 137$); 15.6 percent “10 to 15 years” ($n = 118$); and, 14.4 percent from “15 to 20 years” ($n = 109$).

Narrative Measures: The role of narrative as a meaningful measure of environmental belief, much like the NEP, was pioneered in exploratory research by Shanahan et al. (1999). The “story” about the fictional “Smiths” was replicated to a large extent with a few minor changes – the setting now took place in Delaware and, for brevity, the number of “outcomes” was reduced from eight in the original to five in the current study (see Appendix E). Otherwise, many features of the original story were preserved, in which competing “stakeholders” such as real estate developers, landowners, county officials, preservation and environmental groups (or combinations thereof) emerge as “winners” or “losers.” Respondents were asked to “force rank” on a 1 to 5 scale (1 = “Best” and 5 = “Worst”) the list of five outcomes. However, only 53.9 percent ($n = 424$) correctly used a mutually exclusive ranking scale; only these are included in the study.

Chapter 3

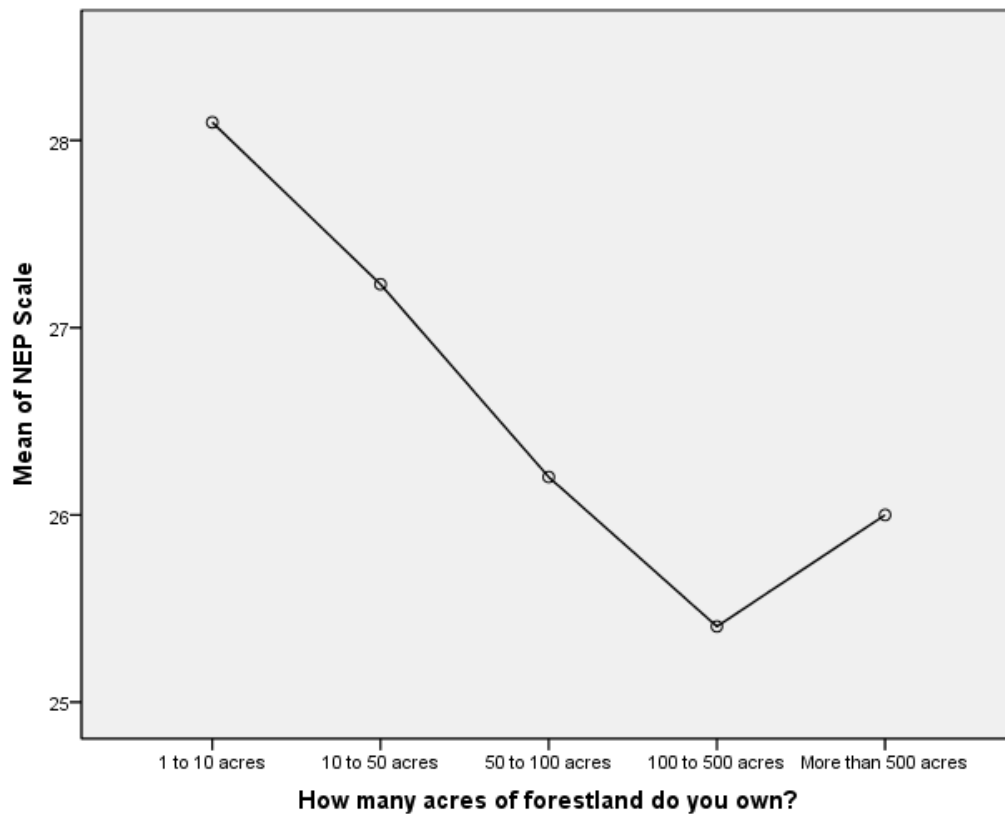
RESULTS

This study examined the effects of television and other mass media exposure on the environmental attitudes of private forest landowners in Delaware, while accounting for the influence of demographic characteristics and other attitudinal variables. The study also assessed the usefulness of narrative measures to explore the relationship between media use and attitudes about the environment. This chapter summarizes the results of the statistical analyses used to test the hypotheses and research questions presented in Chapter 1.

There were key differences between certain demographic groups on some environmental attitudes. On gender, a one-way ANOVA found that women ($n = 195$, $M = 29.56$, $SD = 5.98$) scored significantly higher than men ($n = 549$, $M = 26.53$, $SD = 6.73$) on the 8-item NEP Scale of environmental concern, $F(1, 742) = 31.01$, $p < .001$. A one-way ANOVA also found a significant effect of education on environmental concern, $F(4, 735) = 3.77$, $p < .01$. Post hoc comparisons using the Tukey HSD test indicated that average NEP scores of those with a post-graduate degree ($n = 124$, $M = 28.55$, $SD = 7.41$) were significantly higher than those with a high school degree or less ($n = 228$, $M = 26.43$, $SD = 6.06$). However, among those with some college or technical school ($n = 197$, $M = 27.71$, $SD = 6.64$), an associate degree ($n = 68$, $M = 28.88$, $SD = 6.30$), or a bachelor's degree ($n = 123$, $M = 26.44$, $SD = 6.89$), there were no significant differences.

There were also no significant differences between respondents based on area of residence (urban vs. rural), method of land acquisition (purchase vs. inheritance), or length of forest ownership. However, there was a negative (Spearman rho) rank-order correlation between forest size and environmental concern, $r_s = -.12$ ($p < .01$) (see Figure 1). While a one-way ANOVA was only marginally significant, $F(4, 711) = 2.36$, $p = .052$, two independent t tests found that owners with 1 to 10 acres ($n = 260$, $M = 28.10$, $SD = 6.80$) had significantly higher mean NEP scores than those who owned either 50 to 100 acres ($n = 84$, $M = 26.20$, $SD = 6.82$), $t(342) = 2.22$, $p < .05$, or 100 to 500 acres ($n = 42$, $M = 25.40$, $SD = 7.56$), $t(300) = 2.34$, $p < .05$.

Figure 1: NEP Score and Size of Forest Ownership



The Pearson's correlation found a strong link between political ideology and NEP scores, $r = .40$, $p < .01$ (Table 1). A one-way ANOVA using the Brown-Forsythe test was also significant, $F(4, 169.71) = 34.95$, $p < .001$. Post hoc comparisons (Figure 2) using the Games-Howell procedure found average NEP scores for the very conservative group ($n = 157$, $M = 22.87$, $SD = 7.23$) were significantly lower than all groups. The somewhat liberal group ($n = 65$, $M = 31.92$, $SD = 5.59$) was significantly higher than all groups except the very liberal group ($n = 19$, $M = 31.37$, $SD = 6.95$). Hence, political ideology and environmental concern are linked.

Table 1: Pearson Correlation Matrix – NEP, Weekly TV, and Demographics

	TV	Gender	Age	Income	Education	Political
NEP	.06*	.20***	-.02	-.09*	.07*	.40***
	<i>n</i> = 730	<i>n</i> = 744	<i>n</i> = 737	<i>n</i> = 529	<i>n</i> = 740	<i>n</i> = 727
TV		.11**	.25***	-.32***	-.22***	.07*
		<i>n</i> = 757	<i>n</i> = 749	<i>n</i> = 535	<i>n</i> = 752	<i>n</i> = 738
Gender			-.00	-.19***	.05	.17***
			<i>n</i> = 766	<i>n</i> = 544	<i>n</i> = 768	<i>n</i> = 754
Age				-.34***	-.13***	-.05
				<i>n</i> = 541	<i>n</i> = 762	<i>n</i> = 746
Income					.45***	-.12**
					<i>n</i> = 544	<i>n</i> = 541
Education						.08*
						<i>n</i> = 755

Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (one-tailed).

Figure 2: Political Orientation and Average NEP Scores

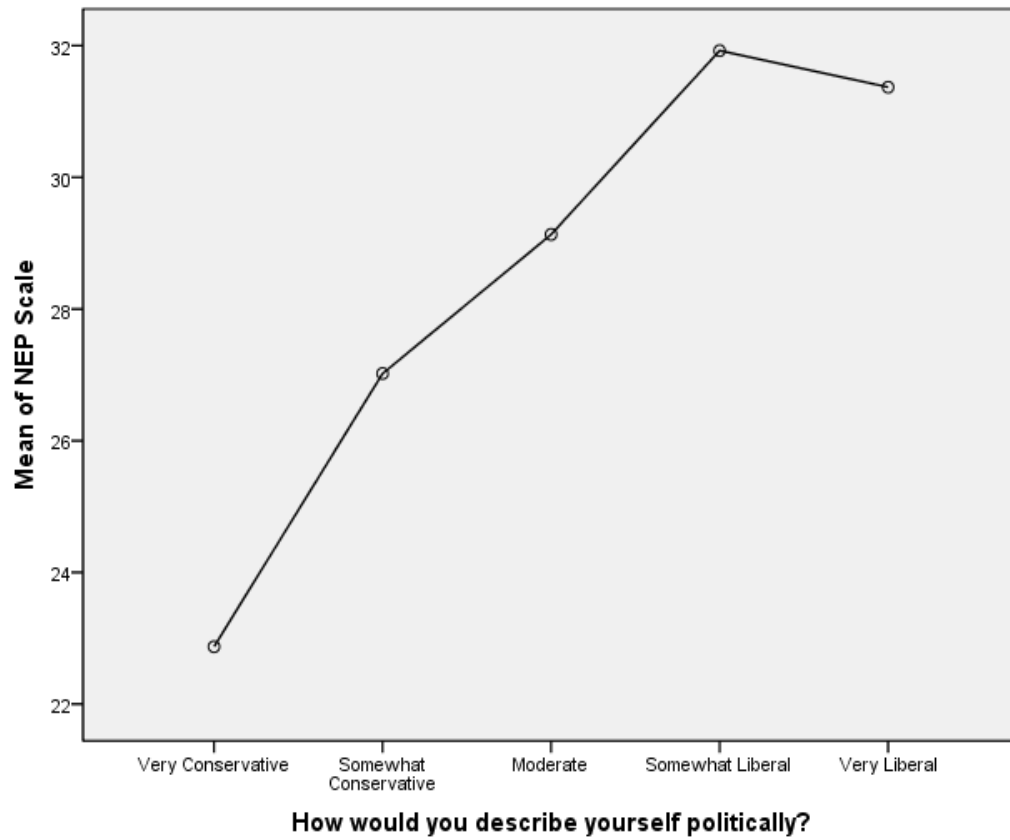


Table 2: Political Orientation and Mean NEP Scores

<u>Political Orientation</u>	<u><i>n</i></u>	<u><i>M</i></u>	<u><i>SD</i></u>
Very Conservative	157	22.87	7.23
Somewhat Conservative	251	27.02	6.09
Moderate	235	29.13	5.30
Somewhat Liberal	65	31.92	5.59
Very Liberal	19	31.37	6.95
Total	727	27.36	6.69

Hypothesis 1

Based on previous research, Hypothesis 1 predicted that television viewing would be negatively correlated with environmental concern. This hypothesis was tested through the computation of the Pearson correlation between weekly TV viewing and average scores on the NEP scale. This analysis found that *higher* levels of weekly television exposure were linked to *higher* levels of environmental concern, $r(730) = .06, p < .05$, one-tailed. Therefore, H_1 is rejected in the current study. While the weak effect size was consistent with previous cultivation studies, the directionality was not (except for Dahlstrom & Scheufele, 2010). Therefore, more analysis of the data was warranted to uncover possible explanations for this result.

A partial correlation analysis between weekly TV viewing and NEP scores (one-tailed) controlling for the combined influence of gender, age, income, education, and political orientation was not significant. The correlations were significant only when controlling for the separate influence of age or education, as shown in Table 3.

Table 3: Partial Correlation Matrix for Weekly TV Viewing and the NEP Scale

Variable:	<i>NEP – Weekly TV</i>		<i>Coefficient with Control Variable(s) Introduced</i>					
	Zero-order		Gender	Age	Income	Education	Politics	All
Correlation	.06		.04	.07	.04	.08	.04	.03
Significance (one-tailed)	$p < .05$		<i>ns</i>	$p < .05$	<i>ns</i>	$p < .05$	<i>ns</i>	<i>ns</i>
Df	728		727	727	526	727	724	522

With a strong correlation between political orientation and average NEP scores (Table 1), it was possible that TV exposure exerted a small influence on conservatives

by “mainstreaming” them toward a higher level of environmental concern. To analyze this, both weekly viewing and political orientation were transformed into variables with three levels. Light viewers ($n = 244$) watched less than 14 hours per week, medium viewers ($n = 286$) watched between 14 and 23 hours per week, and heavy viewers ($n = 230$) watched more than 23 hours per week. Conservatives (somewhat and very) were combined into one group ($n = 422$), moderates were not recoded ($n = 250$), and liberals (somewhat and very) were combined into one group ($n = 86$).

A series of one-way ANOVAs comparing political groups by level of weekly viewing showed that among light viewers (less than 14 hours per week), there were significant differences between mean NEP scores of all three political groups: conservative, moderate, and liberal, $F(2, 227) = 15.06$, $p < .001$, such that conservatives had the lowest scores and liberals had the highest. This was also true for medium viewers (14 to 23 hours per week), $F(2, 267) = 31.74$, $p < .001$. But among heavy viewers (more than 23 hours of TV viewing per week), a Brown-Forsythe test found a significant difference only between the conservative and moderate groups, $F(2, 75.83) = 9.12$, $p < .001$. The conservative group had the lowest NEP score ($M = 25.60$), while the liberal group ($M = 28.90$) had an average NEP score lower than the moderates ($M = 29.33$).

The link between TV viewing, political orientation and NEP scores was also explored with a 3 (light, medium, heavy) x 3 (conservative, moderate, liberal) between-groups ANOVA, as shown in Table 4. Cell sizes, means, and standard deviations for the 3 x 3 design are listed in Table 5.

Table 4: Two-way ANOVA - Political Orientation and Weekly TV on NEP Scores

Dependent Variable: NEP Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta ²
Corrected Model	4344.706 ^a	8	543.09	13.85	.000	.136
Intercept	370852.482	1	370852.48	9456.25	.000	.931
Pol. Orientation	3435.263	2	1717.63	43.80	.000	.111
Weekly TV	340.937	2	170.47	4.35	.013	.012
Political * TV	271.529	4	67.88	1.73	.141	.010
Error	27530.838	702	39.22			
Total	562088.000	711				
Corrected Total	31875.544	710				

a. R Squared = .136 (Adjusted R Squared = .126) * computed using alpha = .05

Table 5: Political Orientation, Weekly TV Viewership, and Average NEP Scores

Political Orientation	Weekly TV	<i>n</i>	<i>M</i>	<i>SD</i>
Conservative	Light	137	24.79	7.17
	Medium	154	25.71	6.17
	Heavy	109	25.60	7.40
	Total	400	25.36	6.86
Moderate	Light	59	27.85	5.90
	Medium	88	29.84	5.19
	Heavy	82	29.33	4.85
	Total	229	29.14	5.31
Liberal	Light	34	31.53	6.27
	Medium	28	33.82	4.16
	Heavy	20	28.90	6.34
	Total	82	31.67	5.89
Total	Light	230	26.57	7.14
	Medium	270	27.90	6.30
	Heavy	211	27.36	6.65
	Total	711	27.31	6.70

The two-way ANOVA test indicated a main effect for weekly TV exposure, $F(2, 702) = 4.35, p < .05$, such that medium viewers ($n = 270, M = 27.90, SD = 6.30$) had significantly higher average NEP scores than light viewers ($n = 230, M = 26.57, SD = 7.15$). There was also a main effect for political orientation, $F(2, 700) = 43.86, p < .001$, such that conservatives ($n = 399, M = 25.36, SD = 6.87$) had significantly lower NEP scores than all other groups. However, the interaction was not significant.

Lastly, to see if there was indeed an environmental cultivation effect for forest landowners who were heavier viewers of television, a regression analysis was run with the demographic variables of gender, age, income, education, and political orientation as controls in the first block, weekly television viewing entered in the second block, and NEP scores (environmental attitudes) as the dependent variable. The regression analysis found that television viewing was not a significant predictor of NEP scores, but gender and political orientation were, as shown in Table 6. Overall, political orientation had the strongest link to environmental concern as measured by the NEP.

Table 6: H₁ Regression Analysis on Weekly TV and Environmental Attitudes

Independent	<i>Dependent Variable: NEP Scale</i>			<i>Correlations</i>		
	B	T	p <	Zero-Order	Partial	Part
Gender	.13	3.025	.01	.200	.131	.120
Political Orientation	.37	8.987	.001	.400	.366	.356
Weekly TV	.03	.585	<i>ns</i>	.063	.026	.023

Note: Only significant betas for included variables are presented. All regressions were run controlling for Gender (0 = male, 1 = female), Age, Education (1 = High School or less to 5 = Postgraduate degree), Income (1 = Less than \$25,000 to 4 = Over \$100,000), and Political Orientation (1 = Very conservative to 5 = Very liberal).

Hypothesis 2

Hypothesis 2 predicted that TV viewing would be negatively correlated with support for government regulation to protect the environment. A Pearson correlation found no significant link between weekly TV exposure and government regulation to protect the environment, $r(750) = -.04, ns$. Therefore H₂ was not supported.

Hypothesis 3

The idea that television cultivates support for the “dominant paradigm” was the basis for Hypothesis 3, which predicted TV viewing would correlate with support for free markets, private enterprise and capitalist values. This was tested by computing the Pearson correlation between weekly TV exposure and responses on a 5-point scale (1 = strongly disagree to 5 = strongly agree) for the statement “Government regulations concerning nature usually destroy businesses and kill jobs.” The analysis found no significant relationship, $r(753) = .00, ns$; therefore H₃ was not supported.

Hypothesis 4

Hypothesis 4 predicted TV viewing would be positively correlated with support for private property rights based on agreement with the statement: “Private property owners should be able to do anything they want with their land.” As expected, TV viewing was significantly correlated with support for private property rights, $r(757) = .13, p < .001$, two-tailed; therefore H₄ was supported (Table 7). TV viewing was also positively correlated with agreement with the statement, “What a property owner does with his or her property *does not* have a major effect on the region,” $r(755) = .18, p < .001$, two-tailed.

Table 7: Pearson Correlation Matrix for TV and Environmental Attitudes

	Gov't Regulation	Regulation & Economy	Property Rights	Property Effects	NEP Scale
TV	-.03 <i>n</i> = 752	.00 <i>n</i> = 755	.13*** <i>n</i> = 757	.18** <i>n</i> = 755	.06* (1-tailed) <i>n</i> = 730
Gov't Regulation		-.38** <i>n</i> = 770	-.21*** <i>n</i> = 773	-.24*** <i>n</i> = 771	.44*** <i>n</i> = 742
Regulation & Economy			.31*** <i>n</i> = 774	.30*** <i>n</i> = 772	-.45*** <i>n</i> = 745
Property Rights				.39*** <i>n</i> = 777	-.27*** <i>n</i> = 748
Property Effects					-.35*** <i>n</i> = 746

Significance levels: * = $p < .05$, ** = $p < .01$, *** = $p < .001$, two-tailed

The correlation matrix (Table 7) for variables studied in Hypotheses 2, 3, and 4 shows that “property rights” and “property effects” were the only variables with a significant link to TV exposure (along with the NEP in Hypothesis 1). However, the table also indicates significant interrelationships between virtually all of the attitudinal variables. Specifically, support for private property rights was negatively correlated with scores on both the NEP and support for government regulation, but positively correlated with TV exposure, property effects, and the belief that government regulation hurts the economy. Thus, private property rights had the same relationship to other variables that television exposure was theorized to have.

To further examine the relationship between these variables, a partial correlation analysis was conducted between endorsement of property rights and weekly TV exposure that included controls for gender, age, income, education, and political orientation. A similar partial correlation analysis was also conducted for the property effects variable, with results shown in Table 8. The analyses showed that after controlling for every demographic variable in the matrix, the correlation between weekly TV viewing and each of the property-related variables remained significant.

Table 8: Partial Correlation Matrix for Weekly TV and Property Variables

<i>TV – Property Rights</i>		<i>Coefficient with Control Variable(s) Introduced</i>					
Zero-order		Gender	Age	Income	Education	Politics	All
Correlation	.13	.13	.15	.13	.11	.15	.14
Significance (two-tailed)	p < .001	p < .001	p < .001	p < .01	p < .01	p < .001	p = .001
df	755	754	746	532	749	735	528
<i>TV – Property Effects</i>		<i>Coefficient with Control Variable(s) Introduced</i>					
Zero-order		Gender	Age	Income	Education	Politics	All
Correlation	.17	.18	.13	.13	.14	.19	.10
Significance (two-tailed)	p < .001	p < .001	p < .001	p < .01	p < .001	p < .001	p = .017
df	753	752	746	532	749	735	528

A regression analysis was also run with gender, age, income, education, and political orientation as controls in the first block, weekly television viewing in the second block, and private property rights as the dependent variable. A similar

regression analysis was run for the property effects variable. Both of these analyses found that even when controlling for demographics, weekly TV viewing was significantly correlated with support for property rights and attitudes toward property effects— along with age, education, and political orientation, as shown in Table 9.

Table 9: H₄ Regression Analysis on Weekly TV and Private Property Variables

<i>Dependent Variable: Property Rights</i>				<i>Correlations</i>		
Independent	B	T	p <	Zero-Order	Partial	Part
Age	-.126	-2.784	.01	-.062	-.120	-.116
Education	-.108	-2.253	.05	-.144	-.098	-.094
Political Orientation	-.215	-5.021	.001	-.200	-.213	-.209
Weekly TV	.149	3.323	.01	.133	.143	.138
<i>Dependent Variable: Property Effects</i>				<i>Correlations</i>		
Independent	B	T	p <	Zero-Order	Partial	Part
Age	.135	3.014	.01	.203	.130	.125
Education	-.126	-2.646	.01	-.203	-.114	-.109
Political Orientation	-.119	-2.780	.01	-.123	-.120	-.115
Weekly TV	.104	2.328	.05	.177	.104	.099

Note: Only significant betas for included variables are presented in the above table. Regressions controlled for Gender (0 = male, 1 = female), Age, Education (1 = High School or less to 5 = Postgraduate degree), Income (1 = Less than \$25,000 to 4 = Over \$100,000), and Political Orientation (1 = Very conservative to 5 = Very liberal).

Hypothesis 5

Hypothesis 5 postulated that TV exposure would be negatively correlated with pro-environmental behavior, measured by two questions: “Have you ever donated money to an environmental group?” and “Do you recycle on a regular basis?” A one-

way ANOVA between TV viewing and the donation question found a significant difference between groups, $F(1, 751) = 4.94, p < .05$, such that those who answered “yes” ($n = 321, M = 18.65, SD = 13.30$) reported less TV exposure than those who answered “no” ($n = 432, M = 20.94, SD = 14.49$). A one-way ANOVA also found a significant link between donations and scores on the NEP Scale, $F(1, 738) = 42.36, p < .001$, such that those who answered “yes” ($n = 318, M = 29.14, SD = 6.47$) had significantly higher average NEP scores than those who answered “no” ($n = 422, M = 26.00, SD = 6.52$). Given a negative correlation between income and TV (Table 1), the possibility that income levels might affect the relationship between TV and donation was explored through a two-way ANOVA. Results, shown in Table 10, indicated a main effect of income on TV viewing, $F(3, 521) = 19.13, p < .001, \text{partial } \eta^2 = .10$, such that lower income levels had significantly higher levels of weekly TV exposure.

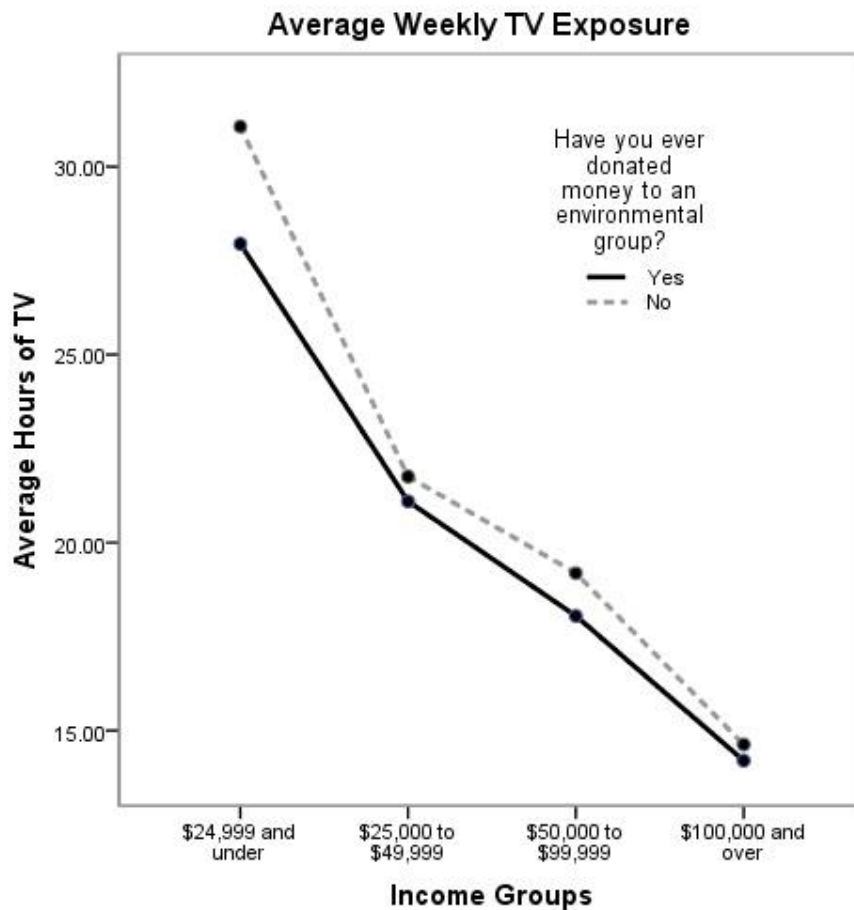
Table 10: Two-Way ANOVA – Income and Donation on Weekly TV Exposure

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta ²
Corrected Model	10767.238 ^a	7	1538.177	9.607	.000	.11
Intercept	178175.669	1	178175.669	1112.781	.000	.68
Donation	197.046	1	197.046	1.231	.268	.00
Income	9191.193	3	3063.731	19.134	.000	.10
Donation * Income	68.511	3	22.837	.143	.934	.00
Error	83421.215	521	160.117			
Total	296213.298	529				
Corrected Total	94188.453	528				

^a R Squared = .114 (Adjusted R Squared = .102) * computed using alpha = .05

The ANOVA table showed that there was a main effect for income, which indicated that this variable exhibited a stronger link to TV exposure than whether or not a respondent had donated to an environmental group (Figure 3).

Figure 3: Income, Weekly TV, and Environmental Donation



A one-way ANOVA on the question “Do you recycle on a regular basis?” found no significant link to weekly TV exposure. Lastly, each of the donation and recycling questions were recoded to permit partial correlation and regression analyses. None of these tests found a link between TV and pro-environmental behavior after controlling for demographics. In conclusion, Hypothesis 5 was not supported.

Research Question 1

Because television has long been the central focus of cultivation theory, the previous hypotheses have only addressed the potential relationship between TV viewing and specific environmental attitudes. But how do other mass media – such as newspaper reading, radio listening, and the Internet use – affect attitudes toward the environment? To explore this question, a Pearson correlation was calculated between other media variables and scores on the NEP Scale, support for private property rights, attitudes toward property effects, support for government regulation, and the belief that environmental regulation hurts the economy. While some media had significant correlations with each other, only radio had a significant correlation with the NEP. However, newspaper was significantly correlated with “property effects” (Table 11).

Table 11: Pearson Correlation Matrix – Other Media and Environmental Attitudes

	Newspaper	Radio	Internet News	Internet Social	NEP Scale	Property Effects
TV	.09** <i>n</i> = 745	.00 <i>n</i> = 752	-.00 <i>n</i> = 751	.08* <i>n</i> = 745	.06* <i>n</i> = 730	.18*** <i>n</i> = 755
Newspaper		.01 <i>n</i> = 758	.09** <i>n</i> = 754	.12*** <i>n</i> = 747	-.01 <i>n</i> = 733	.08* <i>n</i> = 758
Radio			.11** <i>n</i> = 762	.05 <i>n</i> = 755	-.06* <i>n</i> = 739	-.06 <i>n</i> = 762
Internet News				.64*** <i>n</i> = 761	.05 <i>n</i> = 737	.00 <i>n</i> = 763
Internet Social					.02 <i>n</i> = 732	.00 <i>n</i> = 756

Significance: * $p < .05$, one-tailed, ** $p < .01$, one-tailed, *** $p < .001$, one-tailed. Only environmental attitudes with significant correlations were included in the table.

As Table 11 shows, weekly television viewership was positively correlated with weekly newspaper reading, $r(745) = .09$, $p < .01$, as well as Internet use to keep up with family and friends, $r(745) = .08$, $p < .05$. Newspaper reading was also correlated with both forms of Internet use: for news and information, $r(754) = .09$, $p < .01$, and also to keep with friends and relatives, $r(747) = .12$, $p < .001$. Radio listening was correlated with Internet use for news and information, $r(762) = .11$, $p < .01$. Both forms of Internet use were strongly correlated with one other, $r(761) = .64$, $p < .001$.

A partial correlation analysis between radio listening and scores on the NEP scale that controlled for gender, age, income, education, and political orientation was not significant. A similar analysis conducted between newspaper use and the property effects variable was also not significant. Overall, a link between other media use and these specific environmental attitudes was not supported.

But what about overall media use in the aggregate? To examine this, a “total media use” variable was constructed by adding each of the separate media use variables together to create a summative index of weekly media use, ($n = 730$, $M = 47.40$, $SD = 28.18$). This new variable, however, yielded only one significant Pearson correlation with an environmental attitude: property rights, $r(727) = .08$, $p < .05$, two-tailed. Given a strong correlation between TV viewing and overall media use, $r(730) = .53$, $p < .001$, and the fact that the total media and property rights correlation was weaker than the one between TV viewing and property rights alone, $r(757) = .13$, $p < .001$, it appeared that TV viewing accounted for a large proportion of the variance in the link between overall media use and support for property rights.

A partial correlation analysis between total media use and property rights that controlled for demographics as well as TV viewing was not significant, confirming that TV exposure likely represented the best explanation for the link between total media use and support for private property rights.

Research Question 2

Research by Dahlstrom and Scheufele (2010) found that television coverage of environmental issues, while constituting only a small component of overall programming, “emphasized environmental risks or public reactions to environmental problems” (p. 57) during times when these issues were presented. As such, RQ₂ focused on the potential link between audience perceptions of TV’s environmental coverage and corresponding environmental attitudes.

To examine this, a Pearson correlation was calculated between weekly TV exposure and participants’ level of agreement on a 5-point scale (1 = strongly disagree to 5 = strongly agree) with the following two statements: “News stories in the media about nature topics are usually very negative” and “Overall, the news media covers stories about natural resources far too much.” The analysis indicated that the audience perception variables were significant predictors of environmental belief, exhibiting significant correlations not only with each other, but with every single one of the environmental attitude variables studied (see Table 12). For further comparison, the correlations between environmental news perception variables and demographics are shown in Table 12, followed by correlations to media use variables in Table 13.

Table 12: Correlation Matrix - Perception of Environmental News Coverage on Environmental Attitudes

	News Too Much	NEP Scale	Property Rights	Property Effects	Government Regulation	Regulation & Economy
News Very Negative	.43*** <i>n</i> = 767	-.20*** <i>n</i> = 743	.23*** <i>n</i> = 770	.17*** <i>n</i> = 768	-.13*** <i>n</i> = 766	.37*** <i>n</i> = 770
News Too Much		-.41*** <i>n</i> = 743	.27*** <i>n</i> = 769	.36*** <i>n</i> = 767	-.33*** <i>n</i> = 764	.48*** <i>n</i> = 768

*** All correlations significant at the 0.001 level (two--tailed)

As Table 12 indicates, the correlations between both of the media perception variables and other environmental attitudes were all moderately strong at the $p < .001$ significance level. The idea that “news stories about nature topics” are “usually very negative” was positively correlated with a belief that these topics were covered “too much,” $r(767) = .43$. Also, the “very negative” statement was also linked to support for private property rights, $r(770) = .23$; property effects, $r(768) = .17$; and the belief that government regulation hurts the economy, $r(770) = .37$. Conversely, the idea that environmental coverage was “very negative” was negatively correlated with scores on the NEP scale, $r(743) = -.20$, as well as support for government regulation to protect the environment, $r(766) = -.13$. The belief that the environment is covered “too much” had a high negative correlation with the NEP, $r(743) = -.41$, and government regulation, $r(764) = -.33$. Conversely, it was positively correlated with support for property rights, $r(769) = .27$; property effects, $r(767) = .36$; and, was most strongly correlated with a view that government regulations hurt the economy, $r(768) = .48$.

Table 13: Pearson Correlation Matrix – Media Perception and Demographics

	Gender	Age	Income	Education	Political Orientation
News Very Negative	.01 <i>n</i> = 767	-.04 <i>n</i> = 759	-.09* <i>n</i> = 540	-.15*** <i>n</i> = 764	-.18*** <i>n</i> = 750
News Too Much	-.08* <i>n</i> = 765	.11** <i>n</i> = 757	-.11** <i>n</i> = 537	-.24*** <i>n</i> = 762	-.29*** <i>n</i> = 747

Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed).

As Table 13 shows, political orientation was the demographic variable most highly correlated with perception of environmental news coverage – both to the “usually very negative” statement, $r(750) = -.18$, $p < .001$, and also the “too much” statement, $r(747) = -.29$, $p < .001$. However, every demographic had a significant correlation to the statement that the news media cover the environment “too much.”

Table 14: Pearson Correlation Matrix – Media Perception and Media Use

	TV	Newspapers	Radio	Internet News	Internet Social
News Very Negative	.03 <i>n</i> = 755	-.04 <i>n</i> = 755	-.07* <i>n</i> = 761	-.02 <i>n</i> = 761	.04 <i>n</i> = 756
News Too Much	.11** <i>n</i> = 751	.03 <i>n</i> = 752	-.05 <i>n</i> = 759	-.05 <i>n</i> = 758	.00 <i>n</i> = 753

Significance levels: * $p < 0.05$, ** $p < 0.01$ (one-tailed).

Regarding various forms of media use, Table 14 shows weekly TV viewing was the only one linked to the idea that the news media cover natural resources “too

much,” $r(751) = .11$, $p < .01$, one-tailed. Conversely, radio was the only one linked significantly to the “very negative” statement, $r(761) = -.07$, $p < .05$, one-tailed.

To examine the influence of TV viewing and political orientation on the belief that the news media cover stories about natural resources “too much,” a series of one-way ANOVAs were conducted that compared political groups (conservative, moderate, and liberal) by their weekly TV viewing levels (light, medium, and heavy).

Among light viewers (less than 14 hours per week), a Brown-Forsythe test was significant, $F(2, 156.20) = 21.98$, $p < .001$. Post-hoc comparisons using the Games-Howell procedure found that there were significant differences between all three groups: conservatives had the highest mean on this question ($n = 143$, $M = 2.85$, $SD = .91$), followed by moderates ($n = 61$, $M = 2.26$, $SD = .91$), with liberals the lowest ($n = 35$, $M = 1.97$, $SD = .66$). Among medium viewers (14 to 23 hours per week), a Brown-Forsythe test was also significant, $F(2, 157.44) = 10.61$, $p < .001$. Again, post-hoc comparisons using the Games-Howell procedure found significant differences between all three groups: conservatives again were the highest ($n = 155$, $M = 2.75$, $SD = 1.02$), followed by moderates ($n = 89$, $M = 2.42$, $SD = .78$), and liberals the lowest ($n = 28$, $M = 2.07$, $SD = .71$). A one-way ANOVA among heavy viewers (more than 23 hours per week) was also significant, $F(2, 216) = 3.11$, $p < .05$. However, only conservative and liberal groups differed significantly: conservatives had the highest average ($n = 109$, $M = 2.91$, $SD = 1.05$), but were much closer to the moderates ($n = 89$, $M = 2.81$, $SD = 1.00$), with liberals again the lowest ($n = 21$, $M = 2.29$, $SD = 1.23$). This was followed by a two way 3 (light, medium, heavy) x 3

(conservative, moderate, liberal) between groups ANOVA, which found a significant main effect for TV, $F(2,721) = 4.34$, $p < .05$, and political orientation, $F(2,721) = 23.59$, $p < .001$. Yet, the interaction between variables was not significant (Table 15).

Table 15: Two-Way ANOVA – Effect of Political Orientation and Weekly TV Viewing on Perception of Too Much Environmental News Coverage

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta ²
Corrected Model	58.794 ^a	8	7.349	8.162	.000	.083
Intercept	2872.790	1	2872.790	3190.644	.000	.816
Politics	42.470	2	21.235	23.585	.000	.061
TV Groups	7.820	2	3.910	4.343	.013	.012
Politics * TV	5.574	4	1.393	1.548	.187	.009
Error	649.173	721	.900			
Total	5800.000	730				
Corrected Total	707.967	729				

a. R Squared = .083 (Adjusted R Squared = .073) * Computed using alpha = .05

In addition to the previous tests, a partial correlation analysis was run between weekly TV and the belief that the media cover natural resources “far too much” which controlled for gender, age, income, education, and political orientation. The result of this test was not significant. Lastly, a regression analysis was run with gender, age, income, education, and political orientation as controls in the first block, weekly television viewing in the second block, and responses to the statement that the media cover natural resources “far too much” as the dependent variable. Analysis indicated that weekly TV was not a significant predictor when controlling for demographic factors, however, education and political orientation were both significant.

Hypotheses 6a, 6b, and 6c

As an extension of a previous study by Shanahan et al. (1999) that explored the usefulness of narratives to gauge environmental attitudes, this study asked respondents to read a short story about a family selling a dairy farm that also contained forestland (see Appendix E) and then to use forced-choice rankings, with 1 = “best outcome” and 5 = “worst outcome,” (responses were subsequently reverse-coded) to measure preference for a set of five “outcomes” in which various stakeholders “win” or “lose.” In one outcome, the family sells outright to a developer who builds homes on all the land (family “wins,” developer “wins,” conservation groups “lose”). In another, a state farmland preservation agency buys a conservation easement that reduces the family’s tax burden and allows them to continue farming (family “wins,” conservation groups “win,” but developers and county tax officials “lose”).

Hypothesis 6a predicted that the various outcomes should correlate with other measures of belief such as scores on the NEP scale, support for government regulation, support for private property rights, etc. Consistent with environmental cultivation theory, Hypothesis 6b asserted that television viewing would be negatively correlated with “narrative measures” of environmental concern, specifically, those outcomes favoring land use preservation and environmental groups (“cultivation in reverse”). Hypothesis 6c predicted that television exposure would be positively correlated with narrative outcomes that reflect support for the values of the “dominant social paradigm,” such as unrestricted land development and free enterprise. This part of the study depended on respondents completing a set of (1 to 5) mutually exclusive

forced-choice rankings on five outcomes, therefore only respondents ($n = 424$) who successfully completed the exercise in this way were included in the analysis. To test the hypotheses, a bivariate correlation test (Spearman rho) was conducted, with results in Tables 16 and 17.

Table 16: Correlation Matrix (Spearman's rho) – Narrative Outcomes and NEP

Spearman's rho	#2 $n = 424$	#3 $n = 424$	#4 $n = 424$	#5 $n = 424$	NEP $n = 409$
<u>Outcome #1</u>					
Family sells to developer who builds on all land.	-.50**	-.60**	-.57**	.26**	-.41**
<u>Outcome #2</u>					
State conservation group buys an easement. Family continues to own land.		.22***	.14**	-.41**	.22**
<u>Outcome #3</u>					
Environmentalists block sale and buy land after family goes bankrupt for a nature preserve.			.04	-.51**	.44**
<u>Outcome #4</u>					
Family goes bankrupt. County sells land to developers who build on farm but keep forest.				-.37**	.16**
<u>Outcome #5</u>					
Developers buy the land and build on the forest but keep the farmland intact.					-.26**

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

Table 17: Correlation Matrix (Spearman's rho) – Narrative Outcomes, Environmental Attitudes, and Weekly TV Viewing

Outcome	Property Rights <i>n</i> = 423	Property Effects <i>n</i> = 422	Government Regulation <i>n</i> = 418	Regulations & Economy <i>n</i> = 423	Weekly TV <i>n</i> = 419
<u>Outcome #1</u>					
Family sells to developer who builds on all land.	.30**	.41**	-.28**	.33**	.10*
<u>Outcome #2</u>					
State conservation group buys easement. Family continues to own and farm land.	-.23**	-.38**	.21**	-.19**	-.13*
<u>Outcome #3</u>					
Environmentalists block sale and buy land after family goes bankrupt for a nature preserve.	-.21**	-.30**	.33**	-.31**	-.02
<u>Outcome #4</u>					
Family goes bankrupt. County sells land to developers who build on farm but keep forest.	-.15**	-.17**	.03	-.11*	-.05
<u>Outcome #5</u>					
Developers buy the land and build on the forest but keep the farm intact.	.14**	.20**	-.16**	.13**	.01

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

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

As Tables 16 and 17 illustrate, all of the narrative outcomes were significantly correlated not only with each other, but also with scores on the NEP Scale and environmental attitudes concerning property rights, property effects, government

regulation, and the negative effect of regulations on economic growth. Furthermore, there was substantial consistency between measures: Outcome #1, which favors unrestricted development and the right of the family to sell its land outright, was positively correlated with support for private property rights, $r_{s[423]} = .30$, $p < .01$, and the belief that government regulation to protect the environment has a negative effect on jobs and the economy, $r_{s[423]} = .33$, $p < .01$. Conversely, Outcome #1 was negatively correlated with both the NEP and support for government regulation to protect the environment. Therefore, Hypothesis 6a is supported.

Weekly TV exposure was significantly correlated with only two of the five possible story “endings.” Television exposure had a significant negative relationship with Outcome #2, in which a state conservation group purchases an easement that prevents future development of the property, $r_{s[423]} = -.13$, $p < .05$. TV viewing was also negatively correlated with Outcome #3, in which an environmental group turns the land into a nature preserve after blocking the sale of the property and causing the family to go bankrupt, but the link was not significant. The directionality of television viewing’s relationship with Outcome #2, however, lends support to the idea that the “cultivation in reverse” effect – more TV linked to lower environmental concern – could be captured by narrative measures. Therefore, Hypothesis 6b is supported.

Similarly, weekly TV exposure had a positive relationship with Outcome #1, in which the family sells its land to a developer who builds houses on the entire property, $r_{s[423]} = .10$, $p < .05$. The correlation is of a magnitude typical of previous cultivation

studies, and links TV viewing to support for “capitalist values” such as unrestricted land development. Therefore, Hypothesis 6c is also supported.

Partial correlation analyses were also conducted between weekly TV viewing and the narrative outcome #1, which favored unrestricted development, as well as narrative outcome #2, in which a state conservation group purchases a conservation easement and the family continues to farm its land. The test for Outcome #1, which controlled for the combined influence of gender, age, income, education, and political orientation, resulted in a significant partial correlation of $r(306) = .11, p = .05$, two-tailed. A similar test for Outcome #2 was also significant, $r(417) = -.16, p < .01$. The complete matrix, with individual control variables, is shown in Table 18.

Table 18: Partial Correlation Analysis for Weekly TV Viewership and Narrative Outcomes #1 (Developer) and #2 (Conservation)

<i>TV – Outcome #1 Development</i>		<i>Coefficient with Control Variable(s) Introduced</i>					
	Zero-order	Gender	Age	Income	Education	Politics	All
Correlation	.10	.11	.08	.11	.09	.12	.11
Significance (two-tailed)	$p < .05$	$p < .05$	<i>ns</i>	$p < .05$	$p < .10$	$p < .05$	$p = .05$
df	417	416	412	310	416	410	306
<i>TV – Outcome #2 Conservation Easement</i>		<i>Coefficient with Control Variable(s) Introduced</i>					
	Zero-order	Gender	Age	Income	Education	Politics	All
Correlation	-.16	-.16	-.14	-.15	-.16	-.18	-.15
Significance (two-tailed)	$p < .01$	$p < .01$	$p < .01$	$p < .01$	$p < .01$	$p < .001$	$p < .01$
df	417	416	412	310	416	410	306

Lastly, a series of regression analyses were run with gender, age, income, education, and political orientation as controls in the first block, weekly television viewing in the second block, and narrative outcome #1 as the dependent variable. A similar regression analysis was run for outcome #2. Both of these analyses indicated that weekly TV viewing was significantly correlated with support for each of the narrative outcomes, as was political orientation (see Table 19).

Table 19: H₆ Regression Analysis on Weekly TV and Narrative Outcome Variables

<i>Dependent Variable: Outcome #1 - Developer</i>				<i>Correlations</i>		
<i>Independent</i>	<i>B</i>	<i>T</i>	<i>p</i>	<i>Zero-Order</i>	<i>Partial</i>	<i>Part</i>
Political Orientation	-.216	-3.811	< .001	-.231	-.213	-.209
Weekly TV	.117	1.967	= .05	.099	.112	.108

<i>Dependent Variable: Outcome #2 - Conservation</i>				<i>Correlations</i>		
<i>Independent</i>	<i>B</i>	<i>T</i>	<i>p</i>	<i>Zero-Order</i>	<i>Partial</i>	<i>Part</i>
Political Orientation	.188	3.288	< .01	.166	.185	.182
Weekly TV	-.161	-2.699	< .01	-.160	-.152	-.149

Note: Only significant betas for included variables are presented in the above table. Regressions controlled for Gender (0 = male, 1 = female), Age, Education (1 = High School or less to 5 = Postgraduate degree), Income (1 = Less than \$25,000 to 4 = Over \$100,000), and Political Orientation (1 = Very conservative to 5 = Very liberal).

Research Question 3

This research question examined the possible link between other forms of mass media exposure – radio, newspapers, and the Internet – and narrative measures of environmental concern. A rank-order correlation test (Spearman rho) was used to analyze relationships between the five narrative outcomes and weekly measures of newspaper readership, radio listening, Internet use for news and information, and

Internet use to stay in touch with friends and relatives (social media). Results are shown in Table 20.

Table 20: Correlation Matrix (Spearman's rho) – Mass Media and Narrative Outcomes

Spearman's rho	Newspaper <i>n</i> = 414	Radio <i>n</i> = 418	Internet News <i>n</i> = 418	Internet Social <i>n</i> = 415
Developer Buys Land; Builds on All of It	.01	.07	.04	.02
Conservation Group Buys Easement	.02	-.02	.01	-.05
Environmental Group Builds Nature Preserve	.05	-.05	-.11*	-.07
Developer Builds on Farm, But Not Forest	-.10*	-.05	.021	.03
Developer Builds on Forest, But Not Farm	-.01	.01	.00	.03

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

The matrix shows only two significant relationships. Newspaper readership was negatively correlated with Outcome #4, in which the family goes bankrupt, the county acquires the land, and a developer then buys it and proceeds to build on the farmland but not the forest, $r_{s[414]} = -.10$, $p < .05$ (two-tailed). The other significant link was between Internet use for news and information and Outcome #3, in which an environmental group blocks the family from selling and then buys the land after the family goes bankrupt to use it as a nature preserve, $r_{s[418]} = -.11$, $p < .05$ (two-tailed). A partial correlation analysis between Internet use for news and Outcome #3 was significant after controlling for demographics, $r(306) = -.12$, $p < .05$. However, a similar analysis between newspaper readership and Outcome #4 was not significant.

Research Question 4

The relationship between forest ownership objectives and environmental attitudes was the subject of RQ₄, which sought to examine whether particular management goals could be linked to measures such as the NEP. This was examined by calculating mean NEP scores by responses to the question on which respondents indicated “main reasons to own forestland:” investment, scenery, privacy, recreation, cleaner environment, family legacy, timber income, wildlife habitat, and hunting. The ranked items sorted by the number who selected that choice are shown in Table 21. Analysis showed the majority of respondents (91.9%) indicated at least one preference ($n = 723$). Because respondents were able to select multiple items, the choices were not mutually exclusive. However, there was a clear disparity in average NEP scores based on the individual items selected, as shown in Table 22, which breaks down largely along non-economic motivations (privacy, scenery, etc.) and economic motivations (investment, timber income, etc.), with the possible exception of hunting.

Table 21: Forest Landowner Ownership Objectives Ranked by Number Selected

<u>Rank</u>	<u>Objective</u>	<u><i>n</i></u>
1	Privacy	424
2	Wildlife Habitat	421
3	Scenery	302
4	Hunting	292
5	Family Legacy	267
6	Cleaner Environment	223
7	Investment	185
8	Recreation	176
9	Timber Income	82

Table 22: Forest Landowner Objectives and Mean NEP Scores

<u>Category</u>	<u>Objective</u>	<u>n</u>	<u>NEP (mean)</u>
Non-Economic Objectives	Cleaner Environment	214	29.97
	Scenery	293	28.16
	Wildlife Habitat	404	28.09
	Privacy	411	27.59
	Recreation	171	26.94
Economic Objectives	Family Legacy	254	26.65
	Investment	180	25.79
	Hunting	283	25.76
	Timber Income	81	24.90

Research Question 5

How important is environmental communication itself? And how does this relate to other environmental values? Compared to the NEP Scale, the Environmental Communication Scale (ECS) is a relatively new addition to the literature. Therefore, rather than make predictions about its relationship to other variables in the study, RQ₅ sought to examine the ECS in the context of known measures of environmental attitude such as the NEP, support for government regulation of the environment, private property rights, etc. In the current study, only the 5-item “confirming” subscale of the ECS was utilized (see Appendix D), consisting of five statements designed to gauge how important respondents view communicating about environmental issues. For analysis, the Pearson correlation coefficient was computed between the ECS subscale and related variables (see Table 23). All of the correlation coefficients were significant at the $p < .01$ level, and directionality was largely as expected: the ECS was positively correlated with the NEP and support for government regulation to protect the environment, but negatively correlated with private property rights and the belief that regulation hurts the economy. The ECS was also negatively correlated with both of the media perception variables, 1) environmental stories in the media are “very negative” and, 2) the media covers the environment “too much.”

Table 23: Pearson Correlation Matrix – ECS and Environmental Attitudes

	NEP Scale	Property Rights	Property Effects	Government Regulation	Regulation & Economy	News Negative	News Too Much
ECS	.40**	-.23**	-.30**	.35**	-.31**	-.14**	-.38**
	<i>n</i> = 747	<i>n</i> = 773	<i>n</i> = 771	<i>n</i> = 768	<i>n</i> = 771	<i>n</i> = 769	<i>n</i> = 768

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

Research Question 6

The potential relationship between the ECS and various forms of mass media exposure is a natural extension of environmental cultivation research, and constitutes the subject of the final research question. To detect directional effects, a one-tailed Pearson correlation coefficient was computed between the ECS and all of the media use variables: weekly TV viewership, weekly newspaper readership, weekly radio listening, weekly Internet use for news and information, and weekly Internet use to stay in touch with friends and relatives. Results (shown in Table 24) found significant positive correlations between the ECS and both forms of Internet use. There was also a marginally significant negative correlation between weekly TV exposure and the ECS that fell just outside the test’s alpha level, $p = .051$.

Table 24: Pearson Correlation Matrix – ECS and Mass Media Exposure Variables

	TV	Newspaper	Radio	Internet News	Internet Social
ECS	-.06 ¹	.02	.03	.09**	.07*
	<i>n</i> = 756	<i>n</i> = 759	<i>n</i> = 765	<i>n</i> = 763	<i>n</i> = 757

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

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

¹ $p = .051$

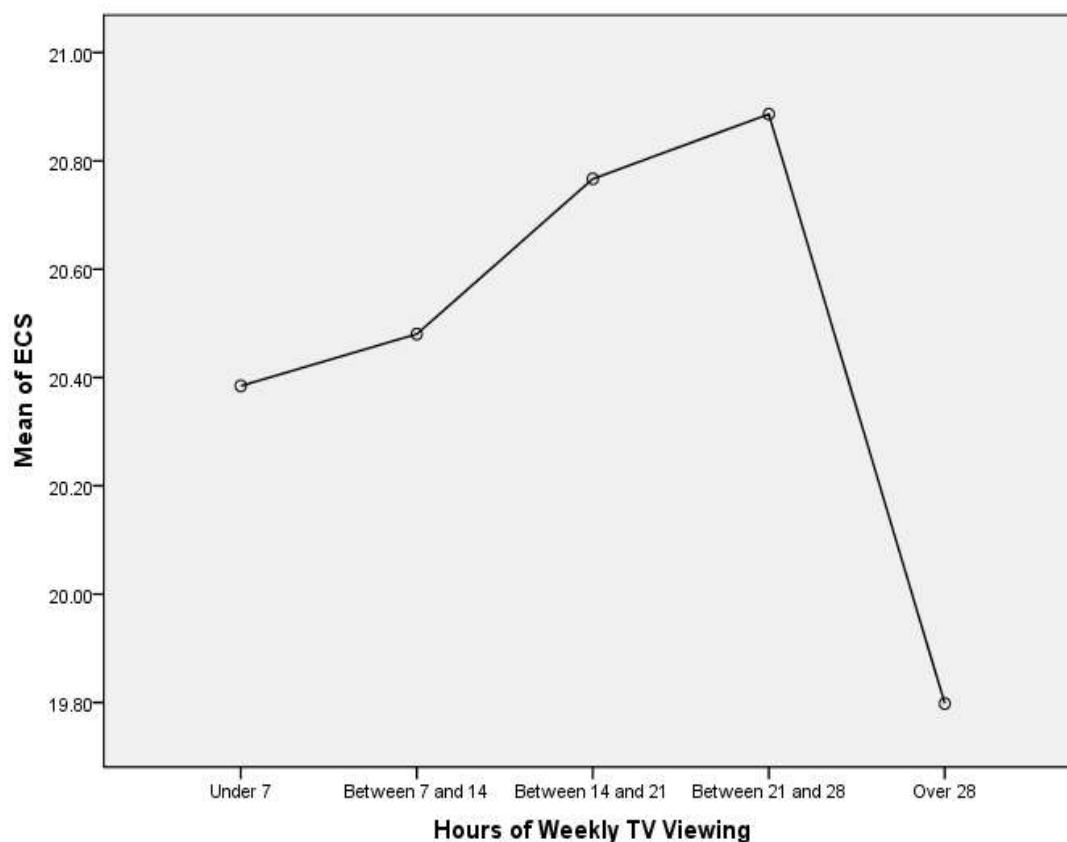
A one-way between groups ANOVA between the ECS Scale and three TV viewership levels (light, medium, heavy) found no significant differences. However, when TV exposure was further stratified into five levels of weekly viewership, the one-way ANOVA found significant differences, $F(4, 751) = 2.59$, $p = .036$. Group sizes, means, and standard deviations for this test are shown in Table 25.

Post-hoc analyses using the Tukey HSD test found a significant difference between the highest level of weekly TV viewership, “Over 28 hours” ($n = 188$, $M = 19.79$, $SD = 3.38$) and the next lowest viewership level, “Between 21 and 28 hours” ($n = 132$, $M = 20.89$, $SD = 3.64$). A graph of the relationship between TV viewership and the ECS scale is shown in Figure 4, which shows a significant drop in the ECS score among those who view more than 28 hours of television per week, such that this group has the lowest average ECS score of any viewing level ($n = 188$, $M = 19.79$, $SD = 3.38$). A regression analysis was run with gender, age, income, education, and political orientation as controls in the first block, weekly television viewing in the second block, and the ECS as the dependent variable. However, the regression revealed no significant relationship between TV and the ECS, and was only significant for political orientation.

Table 25: Mean ECS Scores by Weekly TV Viewing Levels

<u>Weekly TV</u>	<u><i>n</i></u>	<u><i>M</i></u>	<u><i>SD</i></u>
Less than 7 hours weekly	91	20.38	3.55
Between 7 and 14 hours	152	20.48	3.60
Between 14 and 21 hours	193	20.77	3.31
Between 21 and 28 hours	132	20.89	3.64
Over 28 hours	188	19.79	3.38
Total	756	20.44	3.48

Figure 4: Mean ECS Scores by Weekly TV Viewing Levels



Exploratory Analyses

When accounting for differences in demographics – many of which were significantly linked to environmental beliefs on their own – the previously documented link between TV viewing and environmental concern as measured by the NEP Scale was not of the predicted direction, magnitude, or significance level. This might have been due to the nature of the sample, relative amounts of viewing, or another variable.

However, the results in the current study appeared to confirm the possible link between politics and the NEP previously theorized by Good (2007), who cautioned that “a variable that has not been controlled for (e.g., political affiliation) could explain the relationships found in this study (i.e., perhaps liberals watch less television, are less materialistic, and are more ‘environmentally friendly’ than conservatives)” (p. 379). As was evident, political orientation was a significant – if not the *most significant* – independent variable studied, as shown by average NEP scores of political groups (Table 2). Thus, it is reasonable to conclude that liberals seem to be more “environmentally friendly.” However, the notion that liberals watch less television was not indicated by the data. A one-way ANOVA on TV viewing and political orientation using the Tukey HSD test, $F(2, 735) = 4.78, p < .01$, found that moderates ($n = 242, M = 21.91, SD = 14.28$) watched more TV than both liberals ($n = 84, M = 18.15, SD = 14.75$) and conservatives ($n = 412, M = 18.75, SD = 12.85$); however, only the difference between conservatives and moderates was deemed statistically significant.

Looking further, a one-way ANOVA on five levels of political orientation and weekly TV using the Brown-Forsythe test, $F(4, 70.14) = 3.26, p < .05$, found that both the very conservative group ($n = 156, M = 17.38, SD = 12.01$) and the somewhat liberal group ($n = 66, M = 16.45, SD = 11.84$) – which had the *lowest* and *highest* average NEP scores respectively – watched significantly less TV than moderates. The very liberal group, while quite small, actually had the highest level of weekly TV viewing ($n = 18, M = 24.39, SD = 21.77$) but this difference was not significant.

As the key independent variable, television viewing varied significantly across certain demographic sub-groups. For example, a one-way ANOVA between gender and TV viewing using the Brown-Forsythe test, $F(1, 317.36) = 8.47, p < .01$, found that women ($n = 199, M = 22.45, SD = 15.06$) watched significantly more television than men ($n = 558, M = 18.92, SD = 13.44$). However, women also had significantly higher average NEP scores (page 34). Similarly, as Figure 4 showed, those who reported incomes of less than \$25,000 watched significantly more television than all other income groups; however, this did not translate into significant differences in average NEP scores. Therefore, variations in environmental concern as measured by the NEP were not sufficiently explained by weekly TV viewing alone. However, as the results of Hypothesis 1 indicated, medium levels of TV exposure did appear to significantly raise average NEP scores for each of the particular political groups.

Liberals and Conservatives as Heavy Viewers

Similar to Good's (2009) finding that environmentalists might be particularly vulnerable to television's influence, the current study offered limited evidence to support the idea that liberals who are heavy viewers have different environmental attitudes than their lighter-viewing counterparts. For example, separate one-way ANOVA analyses on political orientation and TV viewing showed that the significant differences in NEP scores that existed between all three groups – conservatives, moderates, and liberals – at light and medium viewing levels were not present at heavy viewing levels. Among these heavy viewers, the conservative group still had the

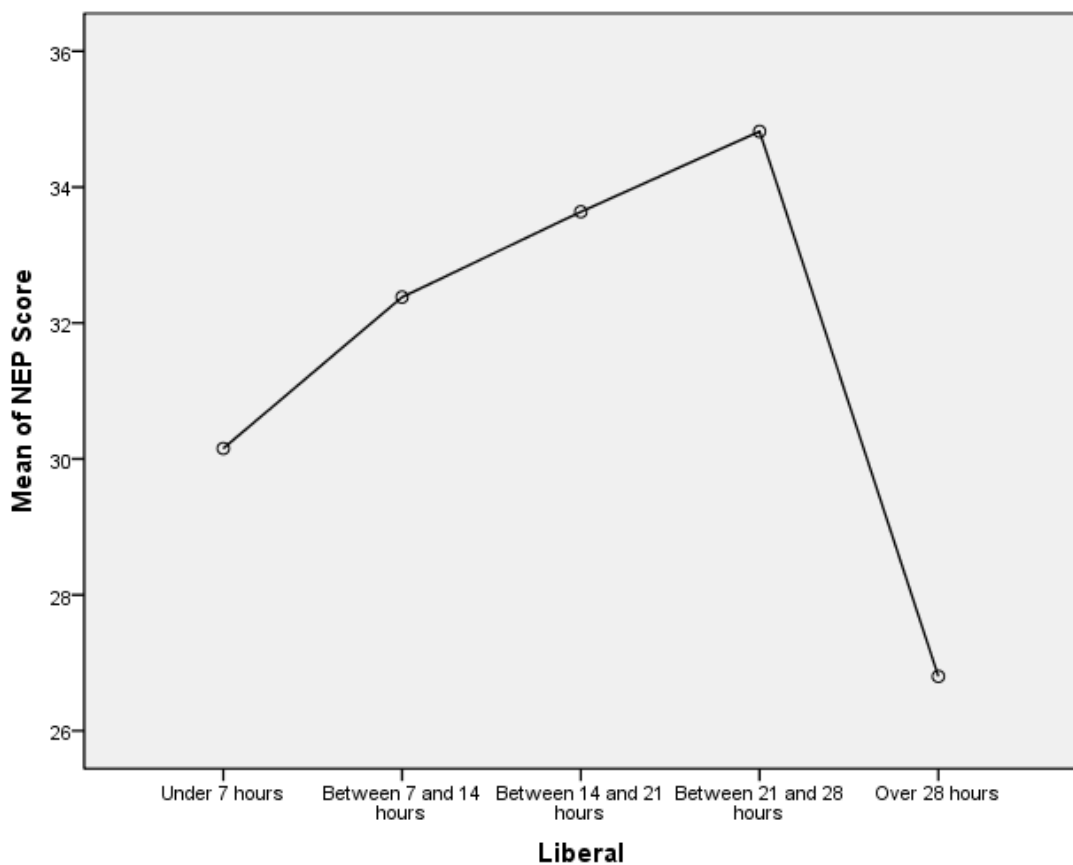
lowest NEP score ($M = 25.60$), but the liberal group ($M = 28.90$) had an average NEP score lower than the moderates ($M = 29.33$) (see Table 5).

As an exploratory measure, rather than segment participants by political orientation into three roughly equal groups according to the sample's *relative* amount of TV exposure (light, medium, and heavy), the groups could also be divided by a five-level interval variable of weekly TV exposure (as was done between TV and the ECS): less than 7 hours, 7 to 14 hours, 14 to 21 hours, 21 to 28 hours, and over 28 hours. Using this approach, a one-way ANOVA between weekly TV and the NEP was conducted for each of the three political groups (conservative, moderate, and liberal). This test found no significant differences among conservatives. Among moderates, the test was not significant overall but did find a significant difference between those who viewed less than 7 hours a week ($n = 23$, $M = 26.35$, $SD = 6.93$) and those who watched 14 to 21 hours a week ($n = 61$, $M = 29.98$, $SD = 5.19$).

However, among liberals, a one-way ANOVA using the Tukey HSD test was highly significant, $F(4, 77) = 5.12$, $p = .001$, such that those who watched more than 28 hours a week ($n = 15$, $M = 26.80$, $SD = 5.38$) had significantly lower average NEP scores than the next two viewing levels: between 14 and 21 hours a week ($n = 22$, $M = 33.64$, $SD = 4.26$) and between 21 and 28 hours a week ($n = 11$, $M = 34.82$, $SD = 4.24$). The relationship between TV viewing and NEP scores among liberals is shown in Figure 5. Even though the number of liberals was quite small in comparison with conservatives, there was a gradual increase in NEP scores with increasing levels of TV viewing – up to a certain threshold (< 28 hours a week). Maybe four or more hours a

day of television marks a line between moderately increased environmental concern and a markedly reduced level. While this link did not survive partial correlation or regression analysis, it offers evidence for previous research by Good (2009) that liberals, much like environmentalists who generally score higher on the NEP scale, could also “stand the most to lose by watching a lot of fictional television” (p. 292).

Figure 5: Weekly TV and Average NEP Scores for Liberal Viewers



Despite some anecdotal evidence in some analyses, there was no significant mainstreaming effect of television viewing on the NEP scores of conservatives as a group. Rather, each of the political groups had a significant increase in the NEP scores

of medium viewers over light viewers before dropping off for those classified as heavy viewers ($n = 230$), which in this study were those who watched more than 23 hours per week. Perhaps it should also be noted that the mean TV viewing level for the entire sample, $M = 19.89$ ($n = 760$, $SD = 13.99$), was somewhat lower than the approximately 33 hours of average weekly viewing for the entire United States population as whole, as reported by Nielsen & Co. (2013).

Chapter 4

DISCUSSION

Cultivation theory has asserted that long-term, cumulative exposure to television's recurrent narratives can exert a small, significant, and measurable influence on its viewers when taking into account their underlying social and demographic differences (Gerbner et al., 1986). One particular area – environmental cultivation – focuses on attitudes about the natural world and environmental issues.

The results presented in this thesis lend support to some of the previous findings within environmental cultivation by establishing a significant link between television viewing and certain environmental attitudes, particularly those concerning private property. Specifically, the study found a positive correlation between TV viewing and the belief that property owners should be able to do whatever they want with their land, and also the idea that an owner's land use decisions do not have an impact on the wider landscape. Because this study focused exclusively on a population characterized by one singular attribute – their private ownership of forestland – finding a link between TV and private property attitudes is significant. Furthermore, cultivation theory's view of television as the dominant storyteller in modern culture was confirmed by results that showed that narrative measures are a valid tool for capturing the relationship between TV viewing and potential environmental "outcomes." This was particularly notable given that the narrative measures centered

on a “story” involving a major issue in the environmental policy arena: land use changes caused by development.

Television Viewing and Attitudes on Private Property

Clearly, the major outcome of this study was the finding of a significant relationship between TV viewing and attitudes toward private property, particularly given that this was in line with previous research indicating that television exposure cultivates support for the values of the dominant social paradigm (DSP), exemplified by capitalism, free enterprise, and private property rights. Whether measured by scaled responses to the two property-related statements or the selection of preferred “endings” to a hypothetical “story,” the positive correlation between TV viewing and private property attitudes survived a number of statistical controls for key demographic variables. In addition, both “property rights” and “property effects” exhibited consistently strong and significant correlations with other measures of environmental belief, which tends to offer another form of validity to the results.

In particular, the fact that narrative measures were effective in capturing this relationship serves to underscore the long-held conception by many cultivation theorists that television is the modern mass-market equivalent of the village storyteller of old, albeit with a global and instantaneous reach that is undergirded by powerful commercial interests. The result not only serves to justify the perspective advanced by Shanahan et al. (1999) that “humans are storytelling beings,” it might also help to answer the question of “whether people, in receiving and processing media messages

on the environment, understand them as technically rational scientific information or more informally as narratives” (p. 407).

At first glance, it might be easy to dismiss the link between TV viewing and attitudes concerning private property as a natural reflection of the worldview of a population that preferences its own self-interest as property owners. However, ownership of property alone wouldn't explain why the correlation tests on the property variables consistently revealed differences based on other factors such as scores on the NEP or political orientation (both negatively correlated). If that were true, then every property owner would unilaterally support unlimited and unrestricted property rights.

But taken from the perspective of environmental cultivation, the results offer support for the view that TV – as part of a wider web of dynamic social and demographic influences – can help to nurture and maintain a worldview that supports capitalism and free enterprise. Television was the only media use variable that was significantly correlated with property rights, property effects, and the narrative outcome that favored unrestricted development. When TV's negative correlation with outcome #2 – the purchase of a “conservation easement” by a state agency – is also taken into account, the results begin to offer a consistent picture of one aspect of television's influence. This viewpoint is made somewhat stronger by the negative relationship between weekly TV viewing and the Environmental Communication Scale (ECS) as well as TV viewing's significant positive correlation with the view that the news media cover the environment “too much.” Overall, the results indicate that TV is clearly a small, but significant, thread in a wider pattern of beliefs that include

attitudes on government regulation, and important socio-demographic characteristics such as gender, age, income, education, and of course, political orientation.

The relationship of television viewing to property attitudes is made more relevant by the fact that the issue of property rights has been, and continues to be, part of an important and contentious debate within the wider environmental policy arena. When Dunlap and VanLiere (1978) first proposed what would become the NEP Scale, they wrote that “our belief in abundance and progress, our devotion to growth and prosperity, our faith in science and technology, and our commitment to a laissez-faire economy, limited governmental planning and private property rights all contribute to environmental degradation and/or hinder efforts to improve the quality of the environment” (p. 19). However, an equally forceful challenge to the NEP has coalesced around what has become known as the “regulatory takings movement,” a school of thought led by libertarian legal scholar Richard Epstein and others that views environmental regulation as an unconstitutional violation of the Fifth Amendment protection against unlawful seizure:

Regulatory takings doctrine holds that government regulatory action that negatively affects the value – actual or potential – of private property constitutes a ‘taking’ of property and, as such, is prohibited under the takings clause of the Fifth Amendment of the US Constitution unless affected property owners are fairly compensated (Ramos, 1995).

Under the banner of the “takings” movement, those seeking to assert the priority of property rights in the face of wetland protection statutes or zoning regulations hope to raise the stakes for “fair compensation” to such a high level that

the cost to policymakers and other interested groups would become too expensive to pursue—effectively putting a brake on current and future restrictions on owner rights.

Concerning the issue of forests in the eastern United States and the ongoing pressures they face from increasing development, it is true that television might be merely a small influence among many other societal trends and pre-existing attitudes. But if cultivation theorists are correct that “a slight but pervasive (e.g. generational) shift in the cultivation of common perspectives may alter the balance of social and political decision making” (Gerbner et al., 2002, p. 50), then it is a distinct possibility that at least some of the ongoing fragmentation of the forested landscape is due to the contribution of television’s narrative to the continued maintenance of support for private property rights.

Directions for Future Research

Given the inconclusive results of Hypothesis 1 and the non-significant findings for Hypotheses 2 and 3, it remains a possibility that the link between TV viewing and environmental concern was not fully captured by the abbreviated 8-item NEP scale or the two questions related to the need for government regulation and the potentially negative effect of government regulations on jobs and the economy. Perhaps the full 15-item revised NEP scale would have been more effective at establishing a correlation between TV and environmental attitudes. Similarly, regarding the key variable of TV exposure, some of the previous studies on environmental cultivation (Good 2007; 2009) made use of Shrum et al.’s (2003) 6-item scale to assess levels of viewing, which differs from the method used here. Also, materialism – which figured

prominently in studies by Shrum et al. (2003) and Good (2007; 2009) – was not included in this study for methodological and space considerations. Perhaps the relationship between TV viewing, political affiliation, and environmental attitudes could be more fully addressed in a study that included all of these variables.

However, this study also indicated that newer types of measures – such as the Environmental Communication Scale questions that assess perceptions of the media’s environmental coverage, or hypothetical narrative-based questions – might be used in future studies as valid tools to effectively measure the relationship between media exposure and environmental beliefs. For example, the results of the research question about how TV coverage of environmental issues is “usually very negative” or whether there is “too much” of it indicated that these two statements were both strongly and significantly correlated with other measures of environmental concern. The inclusion of these audience perception variables was meant to build on the study by Dahlstrom & Scheufele (2010) that the environment, though often a small part of prime-time TV’s content, tends to highlight “risks and problems” (p. 58) when mentioned. What the findings reveal is that media perception variables hold a good deal of promise in corroborating and validating other environmental measures.

For cost and other considerations, and also because the population of private forest landowners overwhelmingly preferred direct mail contact, this study employed a mail survey (with some responses gathered by the Internet). In light of research by Shrum (2007) indicating that mail surveys are more likely to engage systematic forms of cognitive processing as opposed to heuristic processing engaged by telephone

surveys, it might be interesting to see if the results obtained here would have been different had cost and other logistical issues permitted the use of a phone survey. With that in mind, it could also be argued that the results obtained here might be more noteworthy given that an environmental cultivation effect was uncovered against the backdrop of a survey method considered less likely to find it. In any case, the current study likely reflects the use of systematic processing strategies by respondents rather than heuristic processing ones.

Also, the composition of the sample included an overwhelming number of conservatives and a relatively small number of liberals, which appears to be endemic to the geographic region as well as participants' status as forest landowners. While this helped to clarify the relationship between political orientation and other variables, the study might have benefited from the inclusion of a larger number of liberals.

Finally, using the cultivation perspective to develop directional hypotheses between television viewing and environmental attitudes depends greatly on accurate and up-to-date content research. As Dahlsrom and Scheufele (2010) cautioned in their study on exposure diversity, "today's television worldviews may be quite different and ... future studies need to examine current effects of these variables based on a more recent content analysis of environmental coverage on television" (p. 63).

CONCLUSION

Environmental cultivation research maintains the view that the ubiquitous world of television constitutes a full-fledged narrative “environment” in its own right, one that envelops its viewers in a pervasive cultural worldview that can create, stabilize, and reinforce attitudes and beliefs about the environment. As Gerbner (1992) wrote, “Our cultural environment is the system of stories and images that cultivates much of who we are, what we think, what we do, and how we conduct our affairs” (p. 4). Therefore – in small but significant ways – television can have a measurable impact on how humans perceive and take action with regard to natural resources such as private property and forests, both of which are thought to represent crucial links in the environmental chain.

This study showed that the idea of television as a storyteller is a valid one and that exposure to television’s stories can be significantly linked to how viewers think stories in the real world – stories about families, environmental groups, real estate developers, and state preservation agencies – should turn out. If policymakers are concerned about the permanent conversion of private forestland to other uses, then these results are good reason to think that television helps to foster a narrative about individual freedom, private property rights, and the benefits of land development.

Narratives about the environment, much like other stories, are not necessarily about mutually exclusive choices or black-and-white depictions of good versus evil. People can rightly believe that recycling aluminum cans is good and beneficial and also believe that they should be able to sell their forestland to the highest bidder. Of course, television viewing is only one strand within a powerful web of demographic and social influences such as political orientation, income, education, and gender.

However, if cultivation is correct that “a slight but pervasive” shift in public opinion can “alter the balance of social and political decision making” (Gerbner et al., 2002, p. 50), then the future of our private forests and the many benefits they provide could well be at stake.

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APPENDIX A
COVER LETTER

Dear Forest Landowner:

I am writing to request your help in completing the enclosed survey – developed in association with the Delaware Forest Service and the Department of Communication at the University of Delaware. You were selected to receive this letter because public records indicate that you own forestland in Delaware. This survey should only take about ten minutes to complete and your participation will greatly improve the accuracy of the results. You can also complete the survey on the Internet at https://delaware.qualtrics.com/SE/?SID=SV_3UUxS3aFeCPUT9q

The survey contains 52 questions designed to gather information about:

- Your forestland and how you manage it
- Your attitudes about land use and natural resource issues
- Your use of various media sources

Your participation in this study will enable Forest Service officials to learn how landowners like you think and feel about forest and natural resource management. Your responses will also help policymakers to improve those programs designed to educate and assist forest landowners. In addition, the data collected from this survey will be used in a Master's Thesis project at the University of Delaware. I would be happy to share the results with you at a later date.

To encourage your participation, I would like to assure you of the following:

- The survey should take only 10 minutes (or less) to complete
- The responses are completely anonymous and strictly confidential

Since the results depend on a high response rate, I would sincerely appreciate your completing the enclosed questionnaire and returning it in the pre-paid, pre-posted envelope. By returning the questionnaire or completing the web survey you indicate your consent to participate. While the web-based survey is anonymous, I ask that you please do not write your name on any part of the questionnaire if you return it via the U.S. mail.

If you have any questions about this study, you can contact the persons named below:

John Petersen
Delaware Forest Service
2320 S. DuPont Highway
Dover, DE 19901
(302) 698-4552
john.petersen@state.de.us

Professor Nancy Signorielli
University of Delaware
250 Pearson Hall
Newark, DE 19716
(302) 831-8041
nancys@udel.edu

If you have questions or concerns regarding this study please contact the Investigator or Advisor named above. Thank you for your time and I hope you will participate.

Sincerely,



APPENDIX B

DELAWARE FOREST LANDOWNER SURVEY

Directions:
Please circle **1** for Yes or **2** for No

	Yes	No
1. Do you own forestland? If "no," please go to Question 15 .	1	2
2. Do you take part in major decisions concerning your forestland?	1	2
3. Do you live on or near your forestland?	1	2
4. Have you ever had a timber harvest?	1	2
5. Have you ever considered selling your property?	1	2
6. Do you currently have a written forest management plan? If "yes," please go to Question 10 .	1	2
7. If there was no cost to you, would you be interested in getting a written forest management plan?	1	2
8. Do you think forest planning offers any benefits to landowners?	1	2
9. If there was sufficient financial incentive, would you be interested in a forest management plan?	1	2
10. If there was no cost, would you attend an information session on forest planning if it was held at a convenient time?	1	2
11. Are you aware of federal or state forestland cost-share programs?	1	2
12. Do you participate in any cost-share programs?	1	2

Directions: Please **mark an X** next to the choice that corresponds to your answer. Check all answers that apply.

13. If you do NOT participate in a government cost-share program, what are the reasons?	<input type="checkbox"/> I already participate <input type="checkbox"/> Too much paperwork <input type="checkbox"/> Too many restrictions	<input type="checkbox"/> Too much time <input type="checkbox"/> Not enough money
14. What are your main reasons to own forestland?	<input type="checkbox"/> Investment <input type="checkbox"/> Scenery <input type="checkbox"/> Privacy <input type="checkbox"/> Recreation <input type="checkbox"/> Cleaner environment	<input type="checkbox"/> Family legacy <input type="checkbox"/> Timber income <input type="checkbox"/> Wildlife habitat <input type="checkbox"/> Hunting
15. If you were interested, how would you prefer to receive forestry-related information? (check all that apply)	<input type="checkbox"/> Prefer not to receive <input type="checkbox"/> Email <input type="checkbox"/> Workshops	<input type="checkbox"/> U.S. Mail <input type="checkbox"/> Website

Directions Please circle the number that corresponds with how much you agree with the statement.	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
16. Private property owners should be able to do anything they want with their land.	1	2	3	4	5
17. What an individual property owner does with his or her land does NOT have a major effect on the region.	1	2	3	4	5
18. The government must regulate air, soil, and water quality in order to protect nature.	1	2	3	4	5
19. Government regulations concerning nature usually destroy businesses and kill jobs.	1	2	3	4	5
20. News stories in the media about nature topics are usually very negative.	1	2	3	4	5
21. Overall, the news media covers stories about natural resources far too much.	1	2	3	4	5
22. The balance of nature is very delicate and easily upset.	1	2	3	4	5
23. When humans interfere with nature it often produces disastrous consequences.	1	2	3	4	5
24. Humans are abusing nature.	1	2	3	4	5
25. The so-called "ecological crisis" facing humankind has been greatly exaggerated.	1	2	3	4	5
26. Humans have the right to modify nature to suit their needs.	1	2	3	4	5
27. If things continue on their present course humankind will soon experience a major ecological catastrophe	1	2	3	4	5
28. Humans were meant to rule over nature.	1	2	3	4	5
29. Plants and animals exist to be used by humans.	1	2	3	4	5
30. Conversations about natural resource issues can make a difference.	1	2	3	4	5
31. It is necessary to discuss natural resource issues.	1	2	3	4	5
32. I usually learn something when I listen to others talking about natural resource issues.	1	2	3	4	5
33. Discussing natural resources is important.	1	2	3	4	5
34. Talking about nature is important to our future.	1	2	3	4	5

Directions: Please circle the response or fill in the blank.		Yes	No			
35. Have you ever donated money to an environmental group?		1	2			
36. Do you recycle on a regular basis?		1	2			
37. How many hours do you read the newspaper on an average day ?		___ hours				
38. How many hours do you listen to the radio on an average day ?		___ hours				
39. How many hours do you use the Internet for news/information on an average day ?		___ hours				
40. How many hours do you use the Internet to stay in contact with family/friends (using social media) on an average day ?		___ hours				
41. How many hours do you watch TV on an average day ?		___ hours				
42. How many hours do you watch TV on an average weekend day ?		___ hours				
43. What year were you born? (enter the year in the blank)		19___				
44. What is your gender? (circle your answer)		Male	Female			
45. Is the area where you live mainly... ?	Urban	Suburban	Rural			
46. What is the highest level of education you have completed? (please circle)	High school or less	Some college or tech. school	Associate degree	Bachelors degree	Post-graduate degree	
47. How would you describe yourself politically? (please circle)	Very conservative	Somewhat conservative	Middle of the road	Somewhat liberal	Very liberal	
48. How did you acquire your forestland? (please circle) If you do not own, please go to Question 50 .	Purchase	Inheritance	Another method	Do not own		
49. How many acres of forestland do you own?	1 to 10	10 to 50	50 to 100	100 to 500	More than 500	
50. How many years have you owned your forestland?	Less than 5	5 to 10	10 to 15	15 to 20	More than 20	
51. What is your combined household income?	Less than \$25,000	\$25,000 to \$50,000	\$50,000 to \$100,000	\$100,000 +	Prefer not to answer	

PLEASE READ THE FOLLOWING STORY TO ANSWER THE LAST SURVEY QUESTION.

ONE FAMILY'S STORY

John and Mary Smith own 500 acres in rural Delaware, some of it is forestland; the rest is a dairy farm. The Smiths want to sell because they are unable to make a sustainable profit on their land and their taxes are high enough. Unless they can sell their land, they will have to file for bankruptcy.

Some real estate developers want to buy the farmland; others want to buy the woods so they can build more expensive homes in a "country" setting. The developers do not want to purchase the land if they foresee legal battles ahead.

The woods contain wetlands that help control pollution of the town's water supply. Local environmental groups say the woods are key wildlife habitat for threatened plant and animal species. They say federal laws prevent any development.

The county tax and zoning board is worried that the environmental groups will prevent the sale of the land, resulting in loss of needed tax revenues, which will increase the tax pressure on a financially-stressed community.

The Smiths believe they ought to be able to sell to developers without the threat of lawsuits and receive fair market value for their land.

Also, a state farmland preservation group wants the land preserved as farmland - a disappearing resource.

52. Please **rank** the following possible story outcomes **in order of the best possible outcome** to the story. (**1 = BEST OUTCOME** and **5 = WORST OUTCOME**). Please rank **all the choices**. Thank you.

- _____ The Smiths sell their property outright to a developer who builds homes on all of the land.
- _____ State farmland preservation group purchases a "conservation easement" on the land which forbids any future development on the property. The Smiths continue farming because they now receive a significant tax break on their property.
- _____ Environmental group blocks the sale of the land and the Smiths go bankrupt. The groups buy the land at a discount and use it as a nature preserve. As a nonprofit, it pays no taxes.
- _____ The Smiths are unable to find a buyer and they go bankrupt, after which the county acquires the land. It sells the farm to a developer who builds houses on the farmland, but keeps the forestland intact.
- _____ Real estate developers buy the land and build houses on the forestland, but keep the farmland intact.

APPENDIX C

NEW ECOLOGICAL PARADIGM SCALE

(8-ITEM SHORTENED VERSION)

(Dunlap, Van Liere, Mertig, & Jones, 2000).

Please circle the number that corresponds with how much you agree with the statement.

Strongly Agree	Somewhat Agree	Neutral	Somewhat Agree	Strongly Agree
1	2	3	4	5

1. The balance of nature is very delicate and easily upset.
2. When humans interfere with nature it often produces disastrous consequences.
3. Humans are abusing nature.
4. The so-called "ecological crisis" facing humankind has been greatly exaggerated.
(reversed)
5. Humans have the right to modify nature to suit their needs.(reversed)
6. If things continue on their present course humankind will soon experience a major ecological catastrophe.
7. Humans were meant to rule over nature.(reversed)
8. Plants and animals exist to be used by humans.(reversed)

APPENDIX D

ENVIRONMENTAL COMMUNICATION SCALE

CONFIRMING SUB-SCALE

(Kassing, Johnson, Kloeber, & Wentzel, 2010).

Please circle the number that corresponds with how much you agree with the statement.

Strongly Agree	Somewhat Agree	Neutral	Somewhat Agree	Strongly Agree
1	2	3	4	5

1. Conversations about natural resource issues can make a difference.
2. It is necessary to discuss natural resource issues.
3. I usually learn something when I listen to others talking about natural resource issues.
4. Discussing natural resources is important.
5. Talking about nature is important to our future.

APPENDIX E
NARRATIVE SCENARIO
(Shanahan et al., 1999)

One Family's Story

John and Mary Smith own 500 acres in rural Delaware, some of it is forestland; the rest is a dairy farm. The Smiths want to sell because they are unable to make a sustainable profit on their land and their taxes are high enough. Unless they can sell their land, they will have to file for bankruptcy. Some real estate developers want to buy the farmland; others want to buy the woods so they can build more expensive homes in a "country" setting. The developers do not want to purchase the land if they foresee legal battles ahead. The woods contain wetlands that help control pollution of the town's water supply. Local environmental groups say the woods are key wildlife habitat for threatened plant and animal species. They say federal laws prevent any development. The county tax and zoning board is worried that the environmental groups will prevent the sale of the land, resulting in loss of needed tax revenues, which will increase the tax pressure on a financially-stressed community. The Smiths believe they ought to be able to sell to developers without the threat of lawsuits and receive fair market value for their land. Also, a state farmland preservation group wants the land preserved as farmland - a disappearing resource.

Please rank the following possible story outcomes in order of the best possible outcome to the story. (1 = BEST OUTCOME and 5 = WORST OUTCOME).

___ The Smiths sell their property outright to a developer who builds homes on all of the land.

___ State farmland preservation group purchases a "conservation easement" on the land which forbids any future development on the property. The Smiths continue farming because they receive a significant tax break on their property.

___ Environmental groups block the sale of the land and the Smiths go bankrupt. The groups buy the land at a discount and use it as a nature preserve. As a charity, they pay no taxes.

___ The Smiths are unable to find a buyer and they go bankrupt, after which the county acquires the land. It sells the farm to a developer who builds houses on the farmland, but keeps the forestland intact.

___ Real estate developers buy the land and build houses on the forestland, but keep the farmland intact.

APPENDIX F

IRB APPROVAL LETTER



RESEARCH OFFICE

210 HULLIHEN HALL
UNIVERSITY OF DELAWARE
NEWARK, DELAWARE 19716-1551
Ph: 302/831-2136
Fax: 302/831-2828

DATE: May 12, 2011

TO: John Petersen
FROM: University of Delaware IRB

STUDY TITLE: [220400-1] Forest Landowner Communication Study

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: May 12, 2011

REVIEW CATEGORY: Exemption category # 2

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Jody-Lynn Berg at (302) 831-1119 or jlberg@udel.edu. Please include your study title and reference number in all correspondence with this office.