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Trends in public attention to the environment from 1956 to 2005

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TRENDS IN PUBLIC ATTENTION TO THE ENVIRONMENT FROM 1956 TO 2005

by

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TRENDS IN PUBLIC ATTENTION TO THE ENVIRONMENT FROM 1956 TO 2005

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ABSTRACT

A continuous measure of public environmental concern was created using the appearance of environmental content in mass-circulation magazines between January 1956 and December 2005 to investigate Downs' "Issue Attention Cycle", the public response to physical and non-physical episodic events, and the relationship between sectors of environmental concern. The results indicated that environmental concern follows discernible cycles peaking in 1970, 1990, and 2000. Each cycle exhibits an asymmetrical decrease in concern resulting in a ratcheting of environmental concern upwards over the study period. A multivariate regression analysis was used to test for relationships between various sectors of environmental concern. The occurrence of physical and non-physical episodic events was not found to be a strong predictor of environmental concern. The dynamics of these cycles of environmental concern will have far-reaching implications for policy makers.

ACKNOWLDEGEMENTS

To my mother, whose unconditional love and support never ceases to amaze me. I hope to one day provide the same limitless encouragement to my children.

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> **We of an older generation can get along with what we have, though
> with growing hardship; but in your full manhood and womanhood
> you will want what nature once so bountifully supplied and man so
> thoughtlessly destroyed; and because of that want you will reproach
> us, not for what we have used, but for what we have wasted...So any
> nation which in its youth lives only for the day, reaps without
> sowing, and consumes without husbanding, must expect the penalty
> of the prodigal whose labor could with difficulty find him the bare
> means of life.**
>
> **-Theodore Roosevelt, "Arbor Day – A Message to the School-
> Children of the United States", 1907**

In 2007, the quality of the environment has been widely discussed in news stories,

magazine articles, and everyday conversation. With the recent release of Al Gore's *An*

Inconvenient Truth, Edward Burtynsky's *Manufactured Landscapes*, the documentary

Who Killed the Electric Car, and the *Live Earth* global concerts, one could even say that

environmental quality has crept into blockbuster cinema and popular music.

But is this interest new, or have people always been concerned with environmental quality? The quote above is taken from a speech delivered by Theodore Roosevelt over a century ago, though it could have been yesterday. The popular countercultural movements of the 1960s and 1970s often celebrated philosophies that can be described as 'environmentalist,' and concern over protecting nature from exploitation led to the creation of vast national parks in the United States even before Roosevelt himself took office.

Research on public environmental interest has identified two distinct periods of major environmental concern, dubbed by Harrison in 2002 as "green waves". These "green waves" involved large-scale increases and decreases in public concern for the environment, with the peaks of concern occurring in 1970 and 1990.

The environmental movement of the 1970s has been described as "a fundamental change in public values in the United States that stressed the quality of the human environment" (Costain & Lester, 1995, p. 26). This period saw a large social mobilization of support for the protection and amelioration of the environment, and was viewed as a "bottom-up" phenomenon where, as described by Costain and Lester, "...environmental objectives [rose] out of deep-seated changes in values about the use of nature" (p. 26). Governments and policymakers responded to these calls for change with new legislation and environmental initiatives. The 1990s saw similar response to environmental concern with the creation of the Canadian Environmental Assessment Act, the United States Federal Clean Air Act of 1990, and the development of the international Kyoto Protocol in 1997. But how do these levels of environmental concern compare? And how do they relate to today's levels of public interest in the environment?

Just as it appears that public concern for the environment has risen in the past with distinct periods of mass interest, there have been periods of disinterest. As the title of Shellenberger and Nordhaus's (2004) *The Death of Environmentalism* clearly suggested, some debate has arisen over the vitality and relevance of the environmental movement in the past few years. The authors made the point that the American public had not noticeably protested the ecological policies and actions of the Bush administration from 2001 to 2004, one of the most anti-environmental American governments to date (Brechin & Freeman, 2004; Devine, 2004). But did environmentalism and public concern for the environment die during that time, or was it simply in the trough of a down-swing between "green waves"? Have we currently come out of that trough, and are we on the brink of another "green wave"?

To compare environmental concern over time requires a continuous measure of public interest, spanning a substantial period of time. Many studies have investigated why people are concerned about the environment and how that concern has changed (Dunlap, 1992; Greenbaum, 1995; Jones & Dunlap, 1992; Van Liere & Dunlap, 1980). However, these studies did not cover relatively long periods of time, and none of them encompassed both environmental "green waves". In fact, there is currently no recent measure of environmental concern spanning 50 years and capturing the two "green waves" of environmental concern.

This may be explained in part by the fact that the project is so massive: "the environment" is a very broad topic. It is an umbrella term that encompasses myriad diverse issues that deal with nature and the human impact on the natural environment. People can develop interest or concern about a particular aspect of the environment, such

as air quality, climate change, or resource depletion; however, do individuals care or express concern about only one aspect, or sector of concern, at a time? Or do any of these areas of concern help initiate interest in other areas? And is there any relationship between sectors of concern?

Many social scientists have emphasized the importance of sudden, attention-grabbing events in advancing issues on the public agenda and as potential triggers for policy change (Baumgartner & Jones, 1993; Birkland, 1998; Cobb & Elder, 1972). Such events can lead special interest groups, government leaders, policy initiatives, and the public to identify new problems and react to those problems; these responses can sometimes act as events on their own. Some studies have investigated public response to natural disasters or "real-world" events (Ader, 1995; Birkland, 1998), but it is unclear how this response compares to planned events, such as United Nations conferences, new legislation, or protests. Is the type of event a good predictor of public response?

In the study that follows, a measure of public interest in the environment has been developed to examine the time period from 1956 to 2005. This time period is long enough to capture both waves of environmental concern in 1970 and 1990, and more recent opinions. The measure uses the appearance of environmental content in mass-circulation magazines to represent public interest. This measure rests on the assumption that magazines publish at the demand of the public; that is, that for economic reasons, magazines prioritize material that they believe appeals enough to public interest to sell (Newig, 2004). The measure of public opinion over the 50-year period will be used to investigate the trend it follows, the relationship between different sectors of environmental concern, and the public response to different types of events.

This thesis begins with an overview of past studies, and a consideration of how public opinion changes and is influenced over time. In Chapter 2, central research questions are laid out with three defined hypotheses for investigation. Chapter 3 explains at greater length the rationale behind content analysis and methods used to develop and collect the measure of environmental concern. A summary of results is provided in Chapter 4. This study, like most in-depth analyses of complex social phenomena, yielded at least as many new questions as it did answers; Chapter 5 offers conclusions and suggestions for future study.

**The press may not be successful much of the time in telling people
what to think, but it is stunningly successful in telling its readers
what to think about.**
   -Bernard Cohen, 1963

Increasing environmental awareness is crucial for the conservation of our natural

environment. However, the process by which societies as a whole become aware of or

concerned about environmental issues and whether their concern leads to a widespread

mobilization of its resources to address the problem remains unclear. Why do some

environmental issues or events draw the attention of the public and the media, but not

others? There are many theories of why people become concerned about quality of the

environment; in review of the literature, however, no single, definitive model explains the

dynamics of the rise or fall of environmental concern in the general public.

Van Liere and Dunlap (1980) summarized five hypotheses describing a social

basis for public environmental concern: *age, social class, place of residence, political*

affiliation, and *gender.* Empirical data from twenty-one studies were examined to identify the degree to which a relationship exists between environmental concern and certain demographic categories.

The *age* hypothesis posits that younger people tend to be more concerned about environmental quality than older people. A negative correlation in the data examined by Van Liere and Dunlap (1980) supports this hypothesis. Van Liere and Dunlap (1980) theorized that the young, being less integrated into the economic system, are not threatened economically by social change (p. 183). Further, since solutions to environmental problems often involve changes in behaviours, values, and existing institutions, youth may be more comfortable with the idea of social change than their elders.

Van Liere and Dunlap (1980) found weak support for the hypothesis that an increase in environmental concern is positively associated with *social class* (levels of education, income and occupational prestige); however, they point out that education, when examined on its own, *is* positively associated with environmental concern (p. 190) . It is through education that people become aware of and develop a better understanding about hazards threatening the natural world, thus increasing their level of concern. Education can be considered the cornerstone in fostering positive environmental awareness.

The same study found that urban residents were more environmentally concerned than rural residents (p. 190). Urbanites, frequently exposed to a higher level of pollution and other types of environmental deterioration, might reasonably be expected to be more concerned with environmental quality. A utilitarian view toward the environment by

rural residents is believed to be the reason for their lack of concern since concern often

translates into environmental protection (Van Liere & Dunlap, 1980, pp. 184-185). This

is not to say that rural residents are not concerned with the quality of their environment,

but oppose regulations that may interfere with the use of that environment.

Neither *political affiliation* nor *gender* were found to be a strong indicators of

environmental concern among the general public (Van Liere & Dunlap, 1980, p. 191). It

was thought by the authors that Democrats/Liberals would be more concerned with the

environment than Republicans/Conservatives, since the costs of environmental reform

tend to be opposed by businesses and industry (p. 185).

In examining social bases for environmental concern, Greenbaum (1995)

concluded that there are many complex influences on the degree of concern for the

environment. He found that an increased level of environmental concern in the general

public corresponds with a younger age, higher levels of education, and higher socio-

economic status. Greenbaum also found that higher socio-economic status results in

increased environmental activism and environmentally positive behaviour (p. 140).

However, he points out that the U.S. National Survey found no effect of either income or

occupational prestige on environmental concern (p. 140). This suggests that although

increased frequencies of activism may be observed in those with higher levels of income,

it does not mean that lower classes are not concerned or have no opinion about

environmental conditions; they may lack the resources to take action.

These authors provided many social explanations for variation in public opinion

levels of environmental concern; however, these explanations are not unique to the issue

of the environment. These are the same social characteristics that could explain variation

in other unrelated concerns. It is important these authors resist generalizing environmental concerns to particular categories or characteristics as they would risk committing the ecological fallacy. As well, questions remain unanswered by Van Liere and Dunlap (1980) and Greenbaum that are largely time-dependent. The social basis of environmental concern does not remain static over time; levels of environmental concern will vary in these social categories and do not appear to vary randomly. The period during which these studies were conducted could greatly influence who is more aware of environmental issues, and these results should be placed in their respective contemporary contexts. Nonetheless, levels of concern in both studies could be lower or higher than at a different time than what was surveyed and the component of time should not be overlooked.

The discrepancy in results between Van Liere and Dunlap (1980) and Greenbaum draws attention to the need to differentiate between the terms *attention/concern* and *opinion/attitude*. Public *attention* or *concern* can be defined as the resources (time and otherwise) that people dedicate to an issue, whereas public *opinion* or *attitude* does not actually have to involve the mobilization of any resources (Newig, 2004). The example of being strongly against nuclear power was given by Newig (2004) stating that "…after having once formed this attitude one need not spend any time or other resources on this issue, although this attitude may continuously guide one's actions, and when asked the opinion can always be articulated"(p. 154). Newig provided another example of how to differentiate between *attention/concern* and *opinion/attitude* in adapting Cohen's (1963) assertion that "…public attention does not indicate what people think, but what they think about" (p. 154). Redirecting attention does not involve changing beliefs; that is why

attention tends to pass through distinctive cycles while public opinion does not. During this thesis, attention and concern are used interchangeably.

Trends in public attention are believed to occur in four ways: *linear, constant, cyclical,* and *episodic* (Taylor, 1980). A linear change in public attention would either increase or decrease over time slowly, steadily, and at a regular rate. Under some conditions, public attention may exhibit no real change over time. In this case, it would be considered to be constant. Cyclical shifts in attention display a repetitive trend whereas episodic changes chart sudden or erratic shifts in attention based on events.

It is likely that each of these models could be used to describe public attention or concern for the environment. It is important to point out that since the late 1960s, there have been two major cycles of public attention to the environment, suggesting that shifts are cyclical rather than the other proposed models. Harrison (2002) described these cycles as "green waves". Using data from Gallup polls, she described the first rise in environmental concern or attention to have occurred in the 1960s, coinciding with the first Earth Day. A subsequent decline from the 1970s to mid-1980s was then followed by a surge in environmental concern occurring in the late 1980s, culminating in the second Earth Day. Another decline occurred with the onset of a recession in the early 1990s (p. 67). The idea of cycles of environmental concern is also supported by Dunlap (1992). He found, after piecing together longitudinal data sets from the 1960s to the late 1980s, that environmental concern followed similar patterns of highs and lows.

One would expect to see cycles in public concern as a liberal society permits one to have choice in views, values, and behaviour. This choice would permits cycles to occur as people can change their minds. This idea is supported by Amartya Sen (1970),

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who said that the collective decision-making procedure can not be free of cycles because of liberalism. The "cyclical thesis" of public attention has also been argued by Schlesinger (1986) who attempted to explain shifts in national involvement between public purpose and private interest as the alternation between conservatism and liberalism in the national mood (as cited in Costain & Lester, 1995, pp. 16-17). Schlesinger claimed that the shifts or cycles follow that of a single generation – 30 years. To examine if environmental concern could be explained by such a variation, Costain and Lester (1995) used the space allocated to coverage of environmental topics in the *New York Times Index* from 1890 to 1990 to examine public support and interest. They found public interest in the environment occurred with a very small wave from 1905-1915, a small boom in interest in the 1920s as well as 1930s, and subsequent rise in concern starting in the 1950s, with the largest peak occurring in 1970. The study by Costain and Lester provided evidence that environmental concern did not follow a 30 year cycle and therefore its variation could not be solely explained by generational changes. Although Costain and Lester found more that two periods of environmental concern, they concluded that the public interest prior to 1970 was that of a small elite class rather than the general public and far less than the onset of the largest peak in 1970 where the middle and working classes became involved and concerned with environmental issues (p. 31). This research supports Harrison's conclusion that there was a major wave of concern from the general public in 1970.

Though Costain and Lester only examined titles and space allocated in the *New York Times Index*, the time period studied was exceptionally long and provided an overview of public interest in the environment prior to the 1970s movement. It was

unfortunate that the study stopped on the brink of the second "green wave" described by Harrison, as no comparison could be made between the 1970s movement, the second "green wave", and the policy response to the increase in concern in 1990.

Clearly there is some consensus on the notion that environmental concern follows a cyclical pattern. This cyclical nature of environmental concern was initially introduced as the "issue attention cycle" by Anthony Downs in 1972. Downs stressed that public attention towards an issue rises and falls independently of real world conditions. Using ecology as an example, he described public attention passing through five distinct stages. These stages can vary in duration but always occur in the same order. In the first, or *pre-problem,* stage "undesirable social conditions" (p. 38) exist, but the public is unaware of them. At this time experts or interest groups are the only people alarmed, as the situation has yet to capture the public's attention. Once the public discovers or is alerted to the problem, usually through a dramatic event, it enters the second stage, *alarmed discovery and euphoric enthusiasm,* where confidence in finding a solution prevails. Downs attributed this enthusiasm to solve problems to a view that "obstacles to social progress [are] external to the structure of society itself" implying that with sufficient effort, society should be able to solve every problem without any "fundamental reordering of society itself" (p. 39). This *euphoric enthusiasm* does not take into account necessary costs for the solutions required. At the summit of public attention, the third stage begins – *realization of costs.* Monetary costs, public effort and sacrifices, and restructuring societal arrangements are all associated with finding a solution. People realize that they may have to change their lifestyles to help generate change. Discouragement, boredom with the issue, or avoiding the feelings of helplessness or responsibility are all reasons

proposed by Downs for the decline in the intensity of public interest. During the fourth stage, *decline in public interest*, the public loses the desire to hear or learn about the issue. This allows other issues entering the *alarmed discovery* stage to take the spot light as they are novel and have the ability to capture public attention. In the final *post-problem* stage, Downs described the issue as moving into a "prolonged limbo – a twilight realm of lesser attention or spasmodic recurrences of interest"(p. 39). However, policies, institutions and programs, all created during the time of concern, remain, and can have an impact even after attention has shifted away from the issue.

Although he used ecology as an illustration, Downs clearly made a general statement about public attitudes and behaviour concerning important issues. However, his model of the issue attention cycle is based on perception rather than on a quantitative analysis of issue salience; this is an abstract theory and not based on empirical research.

Dunlap (1992) used the "issue attention cycle" as a benchmark in reviewing trends observed in public opinion towards the environment and compared the cycles to Downs' five stages. He found that the cycle did not experience the natural decline as suggested by Downs but had a rejuvenation in the 1990s, resulting in higher levels of concern than in the 1970s (p. 106). In fairness, Downs' model does not preclude the same issue arising again at a future date and is also silent on how the public discovers an issue; conceivably, the public could discover the same issue again. Dunlap (1992) also noted that there was no data set that continuously monitored public opinion on environmental issues over the entire period of 1960 to 1990, requiring him to piece together incomplete sets of national survey data collected by different individuals asking similar, but not identical, questions.

This thesis investigates the presence of "issue attention cycles" concerning the environment in the general public as proposed by Downs through the use of a continuous measure of public environmental concern from 1956 to 2005, as well as the dynamics of cycles: the increase in attention, the intensity or level of attention, and the decline of attention.

An issue, as defined by Cobb and Elder (1972), is "...a conflict between two or more identifiable groups over procedural or substantive matters relating to the distribution of positions or resources" (p. 82) and its formation depends on the interaction between an initiator and triggering device. An issue is created when, in combination with an event, an initiator creates a link and converts the problem into an issue for a public or private reason[1]. Cobb and Elder gave the example of a mine disaster, where the disaster itself does not create an issue since these events have happened in the past with little or no attention. However, an issue is created when a link is made between the event and an initiator who converts the problem into an issue (p. 85). In short, for an event to become an issue, someone (whom Cobb and Elder would call an initiator) needs to be affected enough by the event to care or drive the event into wider public attention.

Newig (2004) proposed that attention to an environmental issues rises when the environmental conditions are less than desired. This discrepancy can also be highlighted when problem-solving resources improve, adjusting aspiration upwards (p. 164). Environmental quality can be considered a luxury beyond the basic survival and security needs of humans. When those needs are met, we are then able to turn our attention

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[1] Cobb and Elder (1972) describe four initiator types: *Readjustors* who are an individual or party that perceives an unfavourable bias in the distribution of position or resources, *Exploiters*, who are individuals or groups who manufacture an issue for their own personal gain, *Circumstantial Reactors* who react to anticipated events; and *Do-Gooders* who have no positions or resources to gain for themselves but feel the need to react because it is the right thing to do (p. 82).

outward, as proposed by Maslow's (1970) "hierarchy of needs". At times of economic prosperity, when personal concerns are met, increased levels of environmental attention occur. This is supported by Harrison who noted that environmental interest rose during the 1970s and early 1990s and fell during the 1980s, correlating with an economic recession (p. 67). It has also been argued that in order for an issue to rise in interest, it needs to be contentious (Dearing & Rogers, 1996, p. 2).

Hilgartner and Bosk (1988) developed "principles of selection" for issues to remain in the media. The need for drama and novelty is one of these required principles (p. 61). Episodic events, such as environmental accidents, spills, or catastrophes, manifest both drama and conflict, capturing attention quickly. It is unclear what causes decline in attention or why people lose interest in certain topics; boredom with a topic, over-coverage causing no new increase in concern, and new issues taking the place of older ones have been suggested. The dramatic nature of issues and events can capture public attention; over-coverage by the media or a prolonged coverage can decrease the impact it has on levels of concern, resulting in boredom and disinterest in the topic. This has been referred to as the "saturation threshold" (Neuman, 1990, p. 164). This threshold is reached when an increase in media coverage no longer corresponds to an equivalent increase in public response (Neuman, 1990, pp. 163-164).

Similarly, the "zero-sum theory" of public agenda setting describes the carrying capacity of the public's attention as finite. Zhu (1992) described this as a "contradiction in a pluralist democracy: the vast number of social issues that are being raised on the one hand and the limited carrying capacity that the public agenda possesses to handle these issues on the other hand" (p. 825). This contradiction creates competition among issues,

causing new issues to bump older ones off the public agenda. It is important to note that decline in attention paid to a topic does not necessarily imply issue resolution and that all of these suggested explanations are tautological, providing no real explanation of individuals' decline in interest.

Some researchers doubt that public attention follows any clearly discernible pattern. Guber (2003) investigated attitudes of American citizens toward environmental protection over a 25 year period concluding that very moderate changes occurred and no clear cycle of opinions existed. Guber (2003) drew on public opinion poll data from 1973-1998 to test the influence of four theories of the change in public attitudes toward the environment: cohort replacement, economic conditions, federal spending, and media attention. She found that cohort replacement produced a positive, linear impact and when holding all else constant, a one percentage point increase in the annual unemployment rate resulted in a four percent decrease in support. It was found that the federal budget acted as a very weak predictor of public attitudes toward the environment and that media attention only produced a small change. In a conference paper delivered on the same work, she claimed that attitudinal peaks and troughs did not pass through the "issue-attention cycles" described by Downs and were more subject to economic situations, policy costs, media attention, or public boredom (Guber, 2001, p. 15). Newig criticised these findings, claiming that Guber (2003) failed to differentiate between *attention* and *opinion,* and was in fact measuring *opinion,* which does not proceed through cycles in the same way as *attention* (Newig, 2004, p. 153). Also, the measure of public attitude against which Guber (2003) chose to test these theories consisted of those individuals surveyed who picked an extreme answer of "The government is spending too little on

environmental protection" (p. 189). This measure eliminated any individual who may have concern for environmental quality but feels government spending may be constrained by other factors. Furthermore, this question only allowed the respondent to select from three choices: spending too much, too little money, or the right amount. This type of limited answering does not allow respondents to fully express their level of environmental concern, particularly concerns which are neither political nor economic. The use of poll data has many shortcomings (discussed in Chapter 3); this weakens Guber's (2003) results. Because the study involved such a large quantity of data extended over a long time period – including different polls conducted with different wording – the results had been pooled together. This created inconsistencies when comparing results. As well, Guber (2003) willingly pointed out that entire years of missing data had to be interpolated to cover the time period (p. 61). This does not provide a continuous measurement of public opinion toward the environment.

Howlett (1997) also doubted the existence of Downs' "issue attention cycle", and attempted to empirically test it using time-series data on nuclear energy and acid rain issues appearing on government and public agendas in Canada from 1977 to 1992. He concluded that there was little support for either model. Soroka (1999) countered this conclusion, stating that Howlett's "methodology [was] fundamentally flawed" because of his assumption that there is little difference between the media and public agenda (p. 765). Howlett's (1997) study also only examined a period of fifteen years, which could be considered too short to capture a full cycle as described by Downs (1972). Newig offered a similar criticism, outlining the need for large time intervals to detect cycles (p. 156).

It stands to reason that a long time interval for investigation is critical for capturing changing public concern toward the environment. However, without an adequate measure of public concern, the time interval makes no difference. Such is the case with the study by Duffy (1994). With an impressive time series analysis of 123 years, Duffy argued that environmental media coverage did not begin with Earth Day in 1970 but existed prior to that, though the coverage was perhaps not referred to as environmental concern. Through a content analysis of magazine coverage, supplemented with secondary histories, Duffy was able to trace environmental reporting from 1870 to 1993. She found that concern for the natural environment could be divided into eight categories within the period studied:

1. 1870-1900: Aesthetics/Parks
2. 1901-1930: Forests
3. 1931-1949: Soil Conservation
4. 1950s: New Materialism/Pollution
5. 1960s: Mixed Realities/Chemicals
6. 1970s: Earth Awareness
7. 1980s: Ecological Price Tags
8. 1990s: Animal Rights

This study, though examining a remarkable time period, did not provide any type of public concern measure, and simply gave a description of each category and major contemporary cultural changes. This lack of a measure makes it impossible to compare categories and changes in intensity of public environmental concern over the 123-year period.

Soroka (2002) argued for the need to combine mass media analysis, public opinion research and studies of the policy-making process, since a "combination of empirical work on public opinion and on public policy is long overdue" (p. 266). His study

investigated the idea that different issues have different agenda-setting dynamics in media, public, and policy spheres. Regarding the environment, Soroka (2002) proposed that since the public as a whole does not often directly experience environmental events (spills, accidents, catastrophes, etc.), the media plays a role in influencing their level of concern. Environmental issues tend to be exposed through very dramatic events that the media can seize upon and use to increase public concern. Soroka (2002) hypothesized that the media agenda should therefore lead public and policy agendas (p. 268).

To measure the media agenda, Soroka (2002) used a key word search of titles from seven Canadian English-language newspapers and one French-Canadian newspaper. He then created a monthly time series of the number of articles in newspapers with those particular key words in the title. Although a key word search is a practical method for collecting articles from newspapers, it is limited in accuracy because the articles then must be manually verified, since the selected key words could be used in various contexts, resulting in the omission of desired articles or the inclusion of inappropriate ones.

For the public agenda, time series data based on responses to open-ended survey questions measuring public opinion from six Canadian polling firms were used (Soroka, 2002). A drawback of these data is that questions would have varied among firms, and the method of collection would not be consistent. Soroka (2002) acknowledged this point, and referenced Smith (1980, 1985) in suggesting that most responses to "the most important problem" type questions are generally not affected by wording changes (p. 271). Soroka (2002) had to combine the results to create a monthly measure, as not all firms performed a monthly poll. The inconsistency in collection times and methods

leaves room for error in drawing accurate conclusions from these data. The method of using "most important problem" questions also limits the individual to mentioning only one issue and does not allow the listing of other issues of concern. This method of collection runs the risk of respondents forgetting important issues at the time of questioning.

Debate in the Federal Legislature, or Question Period, was used as a measure of the issues capturing the political agenda since the cabinet-centred parliamentary system in Canada tends to be marked by strong party discipline. Soroka (2002) noted that "the majority of important policy discussion takes place unrecorded behind closed doors" (p. 272). He argued that the use of Question Period is a better measure of the policy agenda, since it is more likely to show short-term changes in issue salience rather than spending or legislation, which are slow to show agenda change.

Soroka (2002) found that the public agenda affected the policy agenda, and has a delayed but considerable impact on the media agenda (p. 279). One would expect the policy agenda to respond to public interests since the government is an elected body. Furthermore, it is not economically sound for media groups to report on issues in which the public is not interested, and supports the notion that the public agenda leads the media agenda.

Soroka (2002) concluded that the media play a significant role in increased attention to environmental issues and that the media, the public, and policymakers play mutually reinforcing roles. He further concluded that these dynamics suggest the possibility that while the relationship between the media and public becomes a reciprocal one, the initial relationship is one in which the media leads (p. 279). However, the environmental issue

time series graph presented (Figure 2, p. 277) does not support this conclusion; there, public opinion clearly leads the media response.

Soroka's study does not provide definitive conclusions as to who leads and who follows in regard to agendas but states that "media, public, and policy agendas sometimes lead, and sometimes follow" (p. 281). Soroka attempted to combine public opinion and policy-oriented agenda-setting analysis, and build a model that empirically links media, public, and policy agendas. The model (Figure 1, p. 270) shows no definitive relationship between real-world indicators and the media, public, and policy agendas. Bidirectional influence from each agenda is displayed and the model only highlights that the policy agenda does not influence the public agenda, and media and public agendas do not influence real-world factors. While it is clear from this study that the dynamic interactions between these agendas are complex, this general model does not add any useful information to the search for a causal relationship.

An alternate approach to studying how the public reacts to environmental issues is the model used by Newig. He based his model of the dynamics of public attention on Downs' theory of "issue attention cycles". Newig explored both its theoretical and empirical content and possible links to the ways in which governments respond to cycles of public attention.

The goals of Newig's paper were: to show why clear definitions of terminology are essential for investigating the origins of public attention and its impact on political action; to propose a theoretical approach to understanding issue-attention; to establish a link between agenda-setting and public choice theory; and to test the proposed theory through case studies, thereby ensuring the applicability of Downs' model (p. 152).

Newig believed that "issue attention cycles" exist, that they affect political action and that they can be explained within a coherent theoretical framework (p. 152). He highlighted the importance of defining basic terms to clarify results. Newig defines *attention*, *public*, *issue*, and *cycle* and points out studies that have attempted to compare their results to Downs (1972) while in fact not measuring *attention* but *public opinion* (p. 153). *Attention* and *opinion* are commonly used synonymously, but are in fact very different, as discussed earlier.

Newig used media coverage to best reflect public attention, expressing his dissatisfaction with the use of surveys and polls to measure public attention. Relying on the hypothesis that it is not economically sound for print media to run articles on issues in which the public is not interested, Newig used the number of news articles on acid rain and sulphur emissions, summer smog, and BSE (bovine spongiform encephalopathy, or 'mad cow disease') in three German newspapers to represent public attention to each of these issues.

The issue attention model put forward by Downs simply described the public reaction to an issue but failed to offer a causal mechanism. Based on the assumption of "rational choice theory", which posits that human behaviour is guided by choices so that the best means to a desired goal is achieved, Newig attempted to put forward a more fundamental causal process model.

Newig concluded that the ups and downs of public attention cannot be solely explained by external conditions such as the severity of the environmental problem or the capacity to solve the problem (p. 164). A "self-organizing model" was proposed that

consisted of the following five mechanisms that could correlate to different stages of public concern, similar to Downs' model:

- Public attention is scarce and requires energy on the part of the individual to take interest in the issue;

- Only when environmental conditions fall below the aspiration level or when the aspiration level rises due to the availability of problem-solving resources does one see a rise in public attention;

- In order to receive attention, an issue must be simple and perceptible;

- Once a critical mass is reached, the issue self-amplifies. Attention towards it grows exponentially;

- The fate of an issue can depend on public attention remaining below a threshold and not being suited to increasing a politician's popularity; or the issue poses political pressure and the politician must react or face a decrease in popularity (p. 166-168).

An issue can re-enter the cycle of public attention once the above-mentioned conditions are met. Newig stressed that it is more likely for an issue that has already received attention to re-enter the cycle than a new issue to enter. He also pointed out that this model is not an equilibrium model in which the beginning and end levels of attention are the same (p. 168).

Using these mechanisms, Newig proposed nine hypotheses that trace the path of public attention surrounding an issue. Applying these hypotheses to three case studies of acid rain and sulphur dioxide emissions, summer smog, and BSE, Newig found that public attention tended to follow a predictable pattern.

Newig's study, however, was short and was not rigorously tested. Though case studies provided good examples, they were not statistically measurable. This creates the opportunity for more longitudinal studies with a stronger emphasis on empirical data.

Large archives of news and print media allow for a thorough study of public concern. As opposed to polls and interviews, "voting at the kiosk" (that is, by buying a newspaper or magazine) allows a person to select issues that they are concerned about without the pressure of responding to an interviewer or the perceived pressure of being judged (Newig, 2004, p. 159). Due to "self interest on the part of the media enterprises", it is not economically viable to report on issues that the public has no interest in and therefore would not spend money to read about (Newig, 2004, p. 160). Some researchers, including Newig and Soroka (2002), have used this argument to support the use of newspapers as a measure of the level of public concern regarding an issue.

This thesis will investigate the patterns and appearances of increased levels of public attention to the environment. This will be done through a content analysis of environmental articles from popular magazines from 1956 to 2005. The appearance of articles on environmental topics occurring in popular magazines will be used as the measure of environmental concern in the general public. It takes longer for magazine articles to reach the public, since many are printed on a monthly basis, requiring editors to use different criteria in selecting articles to reflect the interest of their readers. The delay in reporting can act to filter out smaller news events leaving only the major or attention-provoking issues getting coverage. Using the acquired data, this thesis will take into account Downs' theory of 'issue attention cycle' to test the following three hypotheses:

H1: The decline in issue attention never returns to the original level of attention, that of the *pre-discovery stage* in the "issue attention cycle".

In Downs' "issue attention cycle", he noted that during periods of intense interest, new institutions, programs, and policies were created (p. 39). These actions ensure that the issue never falls to the initial level of concern since these new institutions, programs, and policies remind the public of the original problem or issue. Environmental departments, supporting budgets, and government staffing in agencies help create a base level of awareness about the environment that inhibits attention declining to the original *pre-discovery stage* level. When graphing public attention to the environment, a non-equilibrium cycle as opposed to an equilibrium cycle, one displaying steps rather than waves, would likely be observed.

H2: Attention levels in individual environmental sectors do not increase in isolation but coalesce with other sectors.

When the environment is divided into sectors, or areas of concern, such as air quality, water quality, chemical contamination, etc., it would be expected that these sectors would be interconnected; increases in attention in one sector would not happen in isolation, but occur in other sectors as well. When graphing public attention by sector, one would expect to see rises in concern occurring in groups rather than isolated peaks.

H3: Public environmental concern responds to physical episodic events immediately while response to non-physical episodic events is delayed.

Episodic, or incidental events, have the ability to restart the "issue-attention cycle" proposed by Downs. However, this thesis proposes that the type of event can affect the response in attention by the public. Physical events, including environmental accidents, spills or catastrophes, carry dramatic features that cause an immediate and intense response from the public. The visual nature of images presented by the media can contribute to the shock of physical events. Dramatic events are not politically neutral, and often expose weakness in current legislation and governmental regulation. The fact that the public and political agendas become aware of the event simultaneously does not allow time for government officials to frame the nature and substance of the public problem (Birkland, 1998, p. 56). Non-physical events, such as conferences, meetings, or book releases, do not have such a dramatic nature. They are usually planned well in advance, and take no one by surprise. They also provide reassurance to the public that experts are looking after the problem, reducing cause for alarm. This causes the public to have a delayed response to the events. Birkland argued that episodic events, or "focusing events" as he called them, play a large role in advancing issues or putting issues on the public agenda which can then lead to policy change. He described these "focusing events" as "sudden, relatively uncommon; [they] can be reasonably defined as harmful or revealing the possibility of potentially greater future harm; [their] harm is concentrated in a particular geographical area or community of interest; and [they are] known to policy makers and public simultaneously" (p. 54). The relationship between physical, or "real-world events", and the public agenda was also investigated by Ader (1995). Ader used a content analysis of the *New York Times* to assess the media agenda and secondary data from Gallup poll surveys, *Environmental Quality*, and the *Characterization of Municipal*

Solid Waste in the United States to provide the public agenda and real-world conditions respectively.

However, Birkland only examined natural disasters and industrial accidents and Ader only examined current conditions for air and water pollution and amount of solid waste produced, both failing to take into consideration the effects of non-physical episodic events. Public environmental concern should respond to physical events quickly while the response to non-physical events should occur much more slowly over time.

This thesis will create a measure of public environmental concern to investigate the presence of Downs' "issue-attention cycle" and the dynamics of public concern cycles. The next chapter begins with an explanation of the theoretical background of this study and of the methods used.

The function of the press in society is to inform, but its role in society is to make money.
-A. J. Liebling, 1961

Public policy makers are sensitive to public opinion and levels of concern. Following the first era of environmental awareness, Rosenbaum (1977) argued that "public officials are quite often instruments of public opinion; they tend, especially, to become acutely responsive to public sensitivities when they perceive that something approaching a consensus has developed on some policy matter" (pp. 6-7).

To examine policy response to public concern, Pushchak (1981) noted that a viable measure of public concern is required and described it as begin ...continuous over an extended period of time, unobtrusive (free from experimenter bias), and sensitive to changes in the component issues of the public's environmental worries" (p. 102). Such a measure is necessary to examine the relationship between public concern and policy, particularly leading up to a period of extreme concern. The challenge has been to

develop a longitudinal measure of environmental public concern covering an extended period of time.

3.1 Alternate Measure of Concern

Public attention has been measured in a variety of ways; Baumgartner (2002), for example, used parliamentary debating time and budgets as an indicator of public attention, while Peters and Hogwood (1985) chose to examine the change in governmental structures. One of the most common methods is public opinion surveys, which have extensively been used to measure environmental concern (see Dunlap, 1992; Hellevick, 2002; Jones & Dunlap, 1992; Van Liere & Dunlap, 1981). Van Liere and Dunlap (1981) reviewed measures of environmental concern, such as the perceived seriousness of environmental problems, public support for government spending, the knowledge of environmental problems and issues, support for reforms designed to protect environmental quality, and actual involvement in pro-environmental behaviour. All of these studies required the use of poll or survey data in which it is assumed that the population will reveal through questionnaires or surveys its level of environmental concern and its relation to other issues on the public agenda. Poll and survey data are ideal for revealing the social and economic characteristics of those who are concerned about the environment, including education level, income, and ethnicity. However, time limitations, question consistency, limited depth of issue investigation, and response bias are the obvious shortcomings of this method.

Dunlap (1992) pointed out the difficulty in finding continuous poll data to measure environmental concern, stating that there are "...no data sets that have

continuously monitored public opinion on environmental issues over [the] entire period" from the 1965 to 1990 (p. 90). Dunlap (1992) had to piece together longitudinal poll and survey data from different studies made during that time period that did not have consistent questions or measures of environmental concern. Polls and surveys are conducted by different agencies, and frequently use different procedures, sample sizes, clients, and questioning methods. Some allow respondents to list important issues, while others limit responses to only one from a set list. Though Dunlap (1992) did provide an overview of trends in public concern, the inconsistency of questions between studies made comparing results problematic, ultimately suggesting the inadequacy of using polls and surveys as a longitudinal measure of public environmental concern.

Polls and surveys also only reflect issues that are already established in the minds of the respondents. As Soroka (2002) pointed out, polls only reflect what the respondent thinks is the most important issue, excluding less important ones that may still have high public attention (p. 46). This method of investigation of environmental concern limits the ability of the researcher to capture details of the changes in issue attention. Specifically, polls and surveys are not sensitive enough to detect the beginning of a cycle of concern. To capture the early stages of concern, the polling agent/agency would first have to be aware of the issue in order to ask questions about it – there is a necessary lag or feedback between what is really happening on the ground and what polls are designed to find out. Newig (2004) also made the point that polls or interviews do not show a shared concern but individual attention to an issue (p. 158). For policy makers and politicians to react to public interest, there must be overwhelming consensus on a particular issue. Polls and surveys, however, do not completely reflect the nature of the consensus.

Finally, there is the problem of natural respondent bias. Newig commented that polls and surveys do not measure public attention accurately, since people could be giving a socially acceptable answer to a question that does not, in fact, represent their actual opinion (p. 159). Generally, it is more socially accepted to respond to environmental issues in a positive way or to overstate one's willingness to support environmental issues. When asked a hypothetical question regarding willingness to pay for environmental programs, Freeman (1979) remarked that a respondent "does not have to act on his response or live with its consequences. He incurs no actual utility loss for an inaccurate response" (p. 97).

Though poll and survey data are commonly used to measure public environmental concern, this method does not meet the definition of a viable measure as outlined by Pushchak: it is not continuous in time, free from experimenter bias, and sensitive enough to capture changes in levels of concern. For this study, to address the shortcomings of poll and survey data, a content analysis of popular national periodicals has been used to measure changes in environmental content over time as a reflection of the changes in environmental concern of the public.

3.2 Content Analysis Theory

Content analysis has been used in a variety of research and is defined by Krippendorff (2004) as "...a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (p. 18). It is usually employed to describe patterns or characteristics in the data collected or to identify important relationships within the content of media. Content analysis allows for

the scientific method of collecting observations and measurements in a direct and objective manner to be applied to quantitative and qualitative research. Content analysis has been used in the study of agenda setting by Soroka (2002) to investigate agenda-setting dynamics in media, public and policy agendas where a key word search of Canadian newspapers was used to measure the media's agenda on a variety of topics, including the environment. To investigate the response of the media and public agenda to real-world events, Ader (1995) measured the media agenda by the amount of space dedicated to a random sample of environmental stories (measured in column inches) in the *New York Times* from 1970 to 1990. To measure public attention, Newig used media coverage from German newspapers to examine the public attention to environmental pollution issues.

This thesis uses content analysis to systematically identify the environmental content of popular periodicals. This approach rests on the argument that the environmental content in a broad sample of periodicals allows one to make valid inferences about the level of popular concern at a given time. There is some debate that it is not in fact the public that determines the content published in magazines but the editor. The editor does have complete control over issues covered and authors hired; however, no one, except those with a desire for economic ruin, would print material that would not sell. Even if an author were hired to produce a certain number of articles, if the topic in question had left the realm of public interest or saleable content, it would be expected that the articles remaining on his/her contract would no longer be considered for publication.

The economic argument proposed for magazine content supports the use of magazines as a national public measure of environmental concern. The periodicals

sampled for this study are mass-circulation magazines that must satisfy large audiences with saleable content. Pushchak noted that "unlike small periodicals with limited audiences and revenues, mass-circulation magazines are not likely to bias content at the risk of losing mass revenues" and argued that media content can therefore act as a continuous indicator of public opinion since the publisher would seek to present issues by "...closely monitoring and reproducing changes in public opinion" (pp. 109-110). Newig supported this argument saying that media reports on issues that the public is interested in to maximize their sales (p. 160). He described the choice made by readers as "voting at the kiosk," concluding that this is an expression of people's true preferences (p. 159). It has also been reported that this choice of magazine or newspaper being made by readers is a reflection of the content being consistent with the reader's own social, political or economic values (Sears & Freedman, 1967, p. 194). Newig pointed out that public issues not covered by news media are not publicly relevant because of the "self interest on the part of the media enterprises" (p. 160). It is not cost-effective to publish material in which the public is not interested.

Newspapers have been a common news media used for content analysis; however, for the purpose of this study newspapers were not selected as the measure of public concern as they tend to report on news events while periodicals report on thoughts and opinions of those events. Unlike the regional audience of newspapers, magazines tend to have large national circulations with their content reflecting national popular concerns. With the exception of "news magazines", magazines usually have a small number of salient articles which are of primary interest to the readers at any given time.

Television has been widely debated as a significant measure of public attention. Most theorists, however, seem to agree with Eyal (1981) that:

> Because of various characteristics, television is not the best teacher of the relative salience of issues. The television viewer is time-bound and is forced to follow a series of reports presented in rapid succession. The newspaper reader, on the other hand, may attend to the newspaper fare in his own time, at his own pace, and can reread and re-examine the information made available by the newspaper. In addition, newspapers have the ability to repeat items more often over time. (as cited in Soroka, 2002, p. 33)

The same rationale is even more applicable to periodicals. Magazines have the same ability to be re-read and their information re-examined at the reader's will. Periodicals are considered to have a wider effect because they tend to have not only primary readership, but secondary and other additional readers (Banks & Madansky, 1958). Similar to newspapers, magazines also have the ability to repeat information or issues on the demand of the subscriber.

3.3 Environmental Concern Measure

Of the existing studies using media content as a measure of concern, few cover a long enough time period over a continuous interval to capture events and their response before and after a period of peak or decline in environmental activity. A substantial time period is needed to detect cycles or waves of concern for the environment. Newig recognized this fact for broad issues, such as the environment, and noted that "…it is thus crucial to cover a sufficiently large time range to detect possible attention cycles" (p. 156). In 2003, Guber noted that no recent content analysis of media attention to

environmental issues could be found extending backward in time for more than thirty continuous years (p. 67). One was created for the purposes of her study by counting the number of news stories indexed each year under the headings Environmental Policy and Environmental Movement by *Reader's Guide to Periodical Literature*. Soroka (2002) used a content analysis over a 10 year period from 1985 to 1995, while Newig captured public attention to environmental pollution issues from 1987 to 2002, a 16 year period.

This study is based on the earlier work of Pushchak where a content analysis was used to develop an indicator of environmental concern. This indicator was used to investigate the influence of explanatory variables in the formation of mass environmental concern. These explanatory variables included: physical environment conditions, social and demographic characteristics of the population, economic conditions, the occurrence of episodic events and the national social climate. His approach approximated the method used by Brown (1973), where environmental content of nine mass circulation magazines was measured from 1961 to 1970 for five sectors of environmental concern. The main purpose of Brown's study was to evaluate the responsiveness of each periodical to environmental concern. A major difference from Pushchak's work was that Brown made no conclusions about changes in concern itself or its effect on policy. Pushchak expanded Brown's periodical sample to include 12 mass-circulation magazines and the content analysis resulted in a data set of 1,175 environmental articles from 1956 to 1976, a 20 year period, examining 13 sectors of environmental concern (p. 116).

This current study expands on Pushchak's work by examining a sample of 18 mass-circulation magazines over a 50-year period from 1956 to 2005, using a set of 18

environmental categories or sectors. The resulting content is used to investigate the three

hypotheses proposed in Chapter 2:

1. the existence and pattern of Downs' "Issue Attention Cycle",

2. the relationship between the rise and fall of attention to the environmental

   categories or sectors during the time period in question, and

3. the response of the public to physical and non-physical events.

In comparison to other content analysis studies on environmental topics, this study is

able to capture the two "green waves" of 1970 and 1990 described by Harrison (2002).

By dividing the issue of the environment into categories or sectors of concern, the content

analysis is intended to be sensitive enough to capture shifts in public attention toward

specific environmental issues. Pushchak described the importance of capturing these

shifts in public attention concerning the first environmental movement, since at that time

"...few policies address all environmental issues simultaneously (with the notable

exception of NEPA[2], 1969). Most policies are specifically targeted to one sector or

another" (p. 102). This study provides a continuous, unobtrusive, and sensitive measure

of public attention to the environment over a 50 year period.

A: Sample

The data set collected by Pushchak was based on the magazine categories

suggested by Wolseley (1969) for audience type and content. Wolseley described

magazines as being divided into 12 consumer type categories. Pushchak started with

these categories and deleted specialized categories that were not likely to carry

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[2] The National Environmental Policy Act (NEPA) is the basic national charter for protection of the environment in the United States.

environmental content, such as *confession, travel, and humour*. The categories of *business* and *science* were added since both were likely to carry environmental articles. For each category, Pushchak selected the magazine with the highest circulation to be analyzed for the initial study in 1981.

Later, Pushchak and Bardecki added Canadian magazines that corresponded to the final categories to the sample of periodicals (see Table 3.1) and examined their content over the time period of 1956 to 1999. If an American magazine did not have a corresponding Canadian magazine, the American magazine remained as long as it circulated in Canada. It is important to note that two magazines appear in the category of general interest – for the United States, *Reader's Digest* and *Harpers*; for Canada, *Reader's Digest-Canadian Edition* and *Canadian Forum*[3]. These selections were made by Pushchak to compensate for the loss of the pictorial/general interest magazines *Life* and *Look*.[4] Pushchak excluded magazines from the sample that ceased publication before 1976, were interrupted in publication, or began publishing after 1956 (p. 134). To maintain the continuous dataset, the current study examined the selected periodicals from 1956 to 2005. However, two magazines ceased publication later on in the time period: Canadian Forum ceased publication in 2001 and McCall's ceased publication in 2002. Considering a primary characteristic of this environmental concern measure is its continuous time period, the next circulation leader for those categories (General Interest and Shelter) were selected for 2001 and 2002 respectively.[5] This study was therefore able

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[3] *Canadian Forum* was later replaced by *Harrowsmith Country Living* in October 2000.
[4] *Look* ceased publication in 1971 and *Life* suspended publication in 1972 and resumed it in 1973.
[5] For this study, *Harrowsmith Country Life* and *Better Homes and Gardens* replaced *Canadian Forum* and *McCall's* in the categories of General Interest and Shelter, respectively. It is important to note that the category of Shelter ceases to exist and magazines, such as *Better Home and Garden*, are now classified by the Audit Bureau of Circulation under by the category of Home Service and Home.

Table 3.1 Magazine Categories

Wolseley's Categories	Final Categories	Magazines Sampled by Pushchak (1981) from 1956 to 1976	Magazines Sampled from 1956 to 2005	
			US	Canada
1. General Interest	1. General Interest	Reader's Digest Harpers	Reader's Digest Harpers	Reader's Digest – Canadian Edition Canadian Forum± / Harrowsmith Country Life
2. Women's	2. Women's	Ladies Home Journal	Ladies Home Journal	
3. Men's	3. Men's	Playboy	Playboy	
4. Sophisticated	4. Sophisticated	Esquire	Esquire	
5. Quality	5. Quality	Atlantic Monthly	Atlantic Monthly	MacLean's
6. Confession *	6. Business +	Fortune	Fortune	Canadian Business
7. News	7. News	Time	Time	Time – Canadian Edition
8. Sports	8. Sports	Sports Illustrated	Sport Illustrated	
9. Travel *	9. Science +	Scientific American	Scientific American	
10. Exploration	10. Exploration	National Geographic	National Geographic	Canadian Geographic
11. Humour *	11. Shelter	McCall's	McCall's ±/ Better Homes and Gardens	
12. Shelter				

* deleted from study by Pushchak (1981)
+ added to study by Pushchak (1981)
± magazine ceased publication and was replaced by next circulation leader in that category

Source: Modified from Pushchak (1981), p. 113.

to extend the data set, making it continuous through to the end of December 2005 using the original method developed by Pushchak.

B: Environmental Sectors

Pushchak used the entire article as the unit of analysis, as opposed to the traditional content analysis approach of using select words or sentences. This method focused, as Pushchak described, on the environmental concerns of the general population rather than on the aspects of style or authorship (p. 114). For this study, only articles that illustrated concern that the natural environment was deteriorating were analyzed. Categories or sectors of environmental concern were developed in an attempt to include all of the commonly voiced environmental concerns. Pushchak's original study examined 13 sectors; this was later expanded to 18 as new issues arose that were not in the public's awareness during Pushchak's study period (Table 3.2).[6] For example, climate change was not a well known environmental issue until later in the 20th century. Articles previously collected were re-examined to include these new sectors, although very few were reclassified. The purpose of the categories was to collect articles that expressed concern for different areas of the natural environment. To be included, an article had to express concern or discuss a problem involving one of the 18 environmental sectors. Articles that were not included were those dealing with political and strategic debates or simple descriptions of the environment. Travelogues or descriptions of scenery that failed to express concern, book reviews, poems, fiction, letters, maps, or puzzles were not included.

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[6] For environmental sector definitions, refer to Appendix A.

Table 3.2 Sectors of Environmental Concern[a]

Environmental Categories Examined by Pushchak (1981) from 1956 to 1976	Environmental Categories Examined from 1956 to 2005[b]
1. Air Quality	1. Air Quality (AQ)
2. Water Quality	2. Water Quality (WQ)
3. Chemical Contaminants – Pesticides	3. Chemical Contaminants – Pesticides (PEST)
4. Chemical Contaminants – Other	4. Chemical Contaminants – Other (CHEM)
5. Wildlife – Species	5. Wildlife – Species (WL)
6. Wilderness Areas	6. Wilderness Areas (WA)
7. Environment in General	7. Environment in General (ENVG)
8. Waste	8. Waste (WAST)
9. Human Population	9. Human Population (HP)
10. Radioactivity	10. Radioactivity (RAD)
11. Resource Depletion – Energy	11. Resource Depletion – Energy (ENER)
12. Resource Depletion – Other	12. Resource Depletion – Other (RDO)
13. Noise	13. Noise (NOIS)
	14. Sustainability (SUS)
	15. Biodiversity (BIOD)
	16. Environmental Industry (ENVI)
	17. Climate Change (CC)
	18. Ozone Depletion (OZ)

[a]For definitions of sectors, see Appendix A.
[b]Abbreviations for the sectors of environmental concern are listed in brackets and used in chapter 4.

Source: Modified from Pushchak, R. 1981, p. 115

C: Content Coding

Each of the 18 magazines in the sample was examined for environmental articles from the period beginning January 1956 and ending December 2005. The decision to start in 1956 provided a base of environmental concern before the first signs of popular environmental concern were visible in 1960 (Pushchak, 1981, p. 116). All of the issues of each magazine were examined and no missed entries were allowed.

For each periodical, the table of contents of each issue was examined for possible environmental articles. Any article that was not immediately identifiable by its title or abstract as being non-environmental in nature had its first page examined by the researcher. This helped to avoid missing articles whose title or caption did not provide an accurate description, and helped to eliminate articles with titles that used words associated with the 18 environmental sectors in an alternate context. Each article had to be examined by the researcher because a key word search or word count would not reveal the meaning and the sector of concern of the article. Article verification was required as words often relate different meanings when used in an alternate context. For example, a key word search using "environment" could retrieve an article about interior design describing a "tranquil dining environment". Out of a random sample of 200 of the environmental articles collected, only 28% of them contained words associated with the environment in the title.

Appropriate environmental articles, in addition to being coded for environmental concern sector, were coded for three measures of article prominence or importance. Similar to Pushchak's study, the article length, position, and significance of the article as

indicated by format measures were recorded.[7] These measures were taken to obtain an estimate of how important the environmental article was perceived to be. The journal length, total number of articles published (excluding regular columns)[8], scope of environmental concern, and proposed solution were also recorded (Appendix B). However, the information provided by the scope and proposed solution was not used in this study.

D: Index of Concern Intensity

Pushchak developed an index measure to calculate the relative importance placed on each environmental article. This measure took the combined score of article length relative to length of magazine, position relative to other articles, and formatting measures used to attract attention to the article. The index measure rests on the assumption that if all three measures were maximized, it was most likely to be high in actual intensity, reflecting the importance of the issue at the time of publication. Pushchak's rationale was that:

> Taken individually, each of the three measures, length, position, and attention-getting devices is not a totally reliable indicator of the common underlying trait; the importance of the environmental article. Article length is a good indicator of importance, however there have been long articles in magazines that are largely comprised of photographs, drawings, or personal experiences with little substantive text. Similarly, important articles are usually but not consistently found near the front of the magazine. In a number of cases, an important article has been placed

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[7] For definitions of prominence measures, refer to Appendix C.
[8] The position of the article was recorded relative to the total number of articles published. Only those articles that change in issue publication, as opposed to regular appear columns, were counted in this total. If environmental content appeared in the regular columns, that article was coded but received the lowest position score available. Such that, if there were 5 articles in a particular issue and an environmental story appeared in a regular column, that story would receive a position score of 5 out of 5.

last in order to devote more space to it without interrupting the flow of articles. The same holds for attention-getting devices like cover billing or cover photograph. In some cases a cover photograph has been associated with a short or remotely placed article that would not normally warrant a cover photograph. (p. 117)

However, taken as a whole, the three-part index can be helpful as an indicator of the intensity of concern reflected by a given article.

This intensity index describes the importance placed on the article using audience attention grabbing techniques. The central assumption in creating the intensity index composed of three separate indicators-- length, position, and the use of format devices to attract attention, is that each of the indicators is weighted equally. This is done to avoid subjectivity in assigning greater weight to one indicator over another. Each indicator is weighted equally by computing a common denominator for their respective frequency ranges (normalizing) in a journal and then summing all three indices over the research period.

The score for article length was determined by dividing the number of pages of an article by the total number of pages in the magazine. This gave a relative score that allocated longer articles a higher score over shorter articles. The article position indicator was calculated by dividing the total number of articles per magazine by the article position. This inversion was done to ensure that the score varied in the same prominence direction (i.e. a high number indicated a more intense score) and allowed an article to be placed in position one to receive the highest possible score. Each article examined received a score on its use of format devices to attract reader's attention. A score could

range from one to four depending on the type of formatting devices used (see Appendix C).

Before summing the indicators, each was normalized by magazine to control for the peculiarities in format and presentation of individual magazines. To normalize each indicator, a common denominator was established using Equation 1 and produced a standard score on a common scale between zero and one.

$$\text{Normalized Score of i} = \frac{\text{raw score of i} - \text{minimum raw score of i}}{\text{maximum raw score of i} - \text{minimum raw score of i}} \quad (1)$$

$$\text{where i} = \text{prominence score for either length,} \\ \text{position, or use of format device}$$

Theoretically, the resulting intensity scores could range between zero and three. In this study, the range of scores varied from 0 to 2.7 and the scores were divided into five categories for purposes of analysis: *very low* (0-0.49), *low* (0.5-0.99), *medium* (1.0-1.49), *high* (1.5-1.99), and *very high* intensity (2.0-2.7).

E: Environmental Episodic Events

To examine the response of public environmental concern to environmental events, a list of events was collected. Lists of environmental events do exist (Magill, 1997; Santos, 1999) but for these lists, there has been no systematic method of collection used in understanding why one event was selected to appear on the list over another. For the purpose of this study, a systematic key word search of the *New York Times* was performed between 1956 and 2005 to compile a list of physical and non-physical episodic

events[9]. The *New York Times* was used since it is considered the "newspaper of record" and would provide a preliminary selection tool for environmental events (Suedfeld, 1992, p. 604). This key word search rests on the assumption that an event must be of such importance to be initially reported in the *New York Times*.

An episodic event, for this research, was defined as a measurable event that happened on a particular day, at a particular time. Physical episodic events are those that occur in the natural environment, and have a negative or deteriorating effect on it. Such events include, but are not limited to, oil spills or leaks, air inversions, water and soil contaminations, and radioactivity accidents. Non-physical events are those that respond to deteriorating conditions in the environment but do not have a direct interaction with the natural world. Examples include, but are not limited to, environmental reports, conferences, studies, and protests. In order for an article to be counted from the key word search, it must report on the event as its main topic and not simply mention it. For example, an article that discusses air pollution legislation for New York City, and mentions an air inversion that happened in a previous month, was not counted. However, an article that is reporting on the air inversion that occurred was recorded as a physical episodic event.

The *New York Times* was not used to collect all events for the episodic event list. The rational for this choice related to ease of collection and event type. Proposed legislation in particular can dominate the media, but it may not be ratified – and this is not often reported. Laws and legislation that make it through the rigors of government debate reflect a great public demand and importance. Counts of all environmental

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[9] It is important to note that the *New York Times* was not published from August 10th, 1978 to November 5th, 1978 because of a strike and therefore could not be collected for that time period.

legalization passed by the United States and Canada were included in the non-physical episodic event list, but were not collected using the key word search method. Because of the varying lengths in time between legislation proposal and passing, and inconsistent news reporting on the matter, dates of major environmental legislation passed by the United States and Canada were collected and were added to the list individually. Certain singular events were also added to this list as they did not appear in the results from the *New York Times* key word search performed in this study. These events have occurred and carry with them significant environmental support and influence. These included the OPEC embargo of the 1970s, Earth Day in 1970 and 1990, the book releases for *Our Common Future* by the World Commission of Environment and Development, and Rachel Carson's *Silent Spring*. Also, certain events, such as the OPEC embargo, which did not culminate or occur in one single definable moment, were added to the list after collection.

Key words were selected that corresponded to the pre-selected scopes of environmental concern listed in Table 3.2. The selection of key words was by no means comprehensive and the aim was to collect major and minor events that occurred during the study period that corresponded to the sectors selected for the content analysis. Obviously, there were infinite possibilities for the choice and collection of key word combinations but were limited to the major combinations noted in Appendix D. However, the recurrence of the same articles/events using different word combinations provided reassurance that all major events were recorded.

The *New York Times* was searched using the selected key words, and the data collector protocol required that the specific combination must appear in the title and/or

lead paragraph of each article. Letters to the editor, opinion pieces and proposed legislation or studies were not included, as they did not directly report on a particular event that had occurred. A review of each individual search result was conducted by the researcher (as opposed to obtaining counts) since many titles and lead paragraphs contained the required search words but did not relate to the environmental issues at hand. This study resolved one of the major difficulties in longitudinal content analysis research-- the extraction of meaning from text rather than interpretations of word counts. Each result of the key word search was verified by the researcher and only the first article reporting on an event was coded. For the first article that reported an event, the date of reporting, type of event (physical or non-physical), sector of environmental concern, title (to aid in duplicate elimination), and a short description was recorded. Upon completion of the searches, subsequent articles appearing after the earliest reporting and duplicate articles reporting on the same event were eliminated.

3.4 Subjectivity and Reliability

Researcher subjectivity presents itself as an issue since the selection of articles, selection of sector of environment, and classification of episodic events must all be interpreted by the researcher. Pushchak recognized this issue and states that:

> While this raises the problem of researcher subjectivity, it was judged from pre-test results that errors occurred more frequently in judgements between categories (whether a wildlife or a pesticide article) rather than judging whether or not an article should be counted as environmental. Thus, while one sector of concern might be increased at the expense of another, the total number of environmental articles would be relatively accurate. (p. 115)

It is, therefore, unlikely that an environmental article or event would be absent from the dataset or that overall, misclassification of environmental sectors would occur.

Inter-coder reliability tests were conducted for the four data coders who took part in the study. These tests, consisting of coding randomly selected articles, were conducted by the primary coder to ensure consistent data collection. This ensured that each coder did not miss any relevant environmental articles and coded the content of each environmental article correctly based on sector of environmental concern, scope of environmental issue, and proposed solution to environmental issue (if presented).

As well, although this study limits the type experimenter bias that arises in survey and poll research, this does not mean that this thesis is free from all bias and recognizes that the subjectivity in this research arises from the magazine selection and the choice to collect episodic event from the *New York Times.*

The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them.
-Sir William Henry Bragg (as quoted in Mishra & Koehler, 2006)

Mass circulation magazines, as described by Bowman and Fuchs (1981), constitute a massive and important segment of the communication system in American society (p. 11). As such, content in these magazines can represent mass public concern. In 1981, Pushchak measured the circulation strength of his sample from 1966 to 1976 to be 25% of the United States population (p. 114). Today, the sampled magazines represent 13.5% of the North American population (see Appendix E).

The change in circulation strength could be attributed to the explosion of internet browsing, more magazine choice, and the availability of online magazines. However, even though there is a decrease in circulation strength, the sampled magazines do still provide a measure of public concern toward the environment of a substantial portion of

the North American population. The number of popular periodicals and special interest magazines has grown radically, making it harder and harder for magazines to attract readers. In 1976, only 64 general interest, mass-circulation magazines existed (Pushchak, 1981, p. 139). This is compared to 777 general interest, mass-circulation magazines available in 2005 (Audit Bureau of Circulation, 2001-2005). Therefore, attracting 13.5% of a growing populace with an ever fragmenting magazine population provides a very good representation of public interest. It would be difficult to obtain similar population representation from polls or surveys. Because the circulation data only takes into account primary readership and does not consider secondary or tertiary circulation, in reality this measure of public concern would almost certainly represent more than 13.5% of the population.

4.1 Standardization

The frequency of environmental articles published over the study period was recorded (as described in Chapter 3) and yielded 4,255 articles that expressed concern for the environment (Figure 4.1). It is important to point out that these data are not a sample but a population of all published environmental articles from the sample magazines. Simply recording the frequency of environmental articles does not necessarily measure public environmental concern, but could measure changes (increases *or* decreases) in article publication frequencies for individual magazines. To ensure that a change in actual environmental concern was measured – and not simply an increase or decrease in article publication – the raw data was standardized to a yearly percentage of all articles published from the 18 sample magazines.

Frequency of Environmental Articles between 1956 and 2005
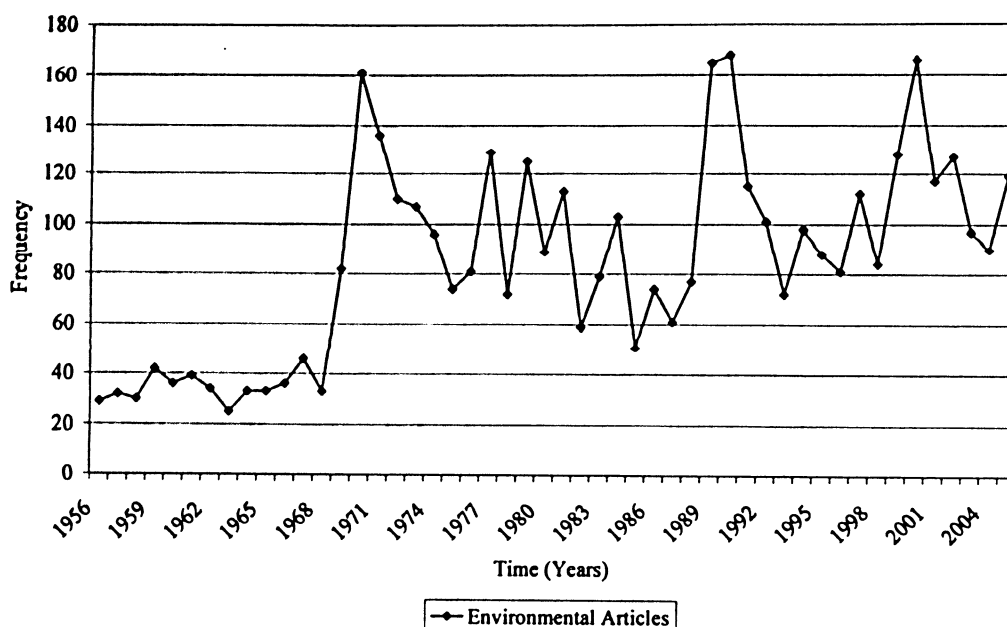
Figure 4.1. Frequency of environmental articles appearing in the 18 sampled magazines between 1956 and 2005.

Since the total number of articles appearing in each magazine was not consistently recorded, a random sample (n=30) of issues was selected from each periodical between January 1956 and December 2005 to estimate the total number of articles published each year[10]. This inconsistency in recording does limit the standardization to an estimate and improvement in the standardization could be achieved through re-examination of all articles over the entire study period. To conduct the random sample, random numbers were selected between 1 and 600 for monthly magazines, between 1 and 1300 for bi-weekly magazines, and between 1 and 2600 for weekly magazines. The number of articles published in each randomly selected magazine issue was recorded. A simple

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[10] Since Canadian Forum and McCall's ceased publication late in the study period, the random sample from these magazines was selected from January 1956 to August 2000 and March 2001 respectively. The replacement magazines, Harrowsmith Country Life and Better Home and Gardens were sampled from September 2000 to December 2005 and April 2001 to December 2005 respectively. Also, because of an availability issue, Reader's Digest (US Edition) was sampled from January 1962 to December 2005.

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regression analysis was performed for each magazine to determine if any significant change in article publication occurred between 1956 and 2005.

For those magazines whose article publication frequencies did not significantly vary over time, the mean number of articles published in each issue was used to calculate the predicted monthly article publication frequency. The mean number of articles published per issue was multiplied by four for a weekly published magazine and by two for a bi-weekly published magazine to calculate the predicted monthly publication frequency.

For magazines that displayed a significant change in frequency of articles published, the predicted number of articles published each month was calculated using a multivariate regression. The sample was fitted against the time variable. If the linear model was significant ($p \leq 0.05$), the resulting line (model) was used to provide an estimate of the number of articles in each issue for that magazine. If the linear model was not significant, models of second ($time^2$) or third ($time^3$) order were fit in the same manner as the straight line models until they were significant ($F \leq 0.05$). Again, since some magazines publish on a weekly or bi-weekly schedule, the predicted number of articles published per issue was multiplied by four or two to produce the predicted monthly article publication frequency for weekly and bi-weekly magazines, respectively.

For each magazine, the predicted monthly publication frequencies were summed for each year to calculate a predicted yearly publication frequency from 1956 to 2005. These yearly values were used to standardize the raw data by dividing the frequency of environmental articles each year by the predicted total frequency of all published articles each year. This produced an annual percentage of magazine articles devoted to

environmental issues, and will be referred to hereafter as standardized environmental concern. This percentage provided a measure of change in environmental content over the study period and excluded any changes in article publication frequencies by individual magazines. The calculated annual percentage of environmental articles was broken down into the sectors of environmental concern. These standardized sectors then represented an annual percentage of all magazine articles devoted to the 18 sectors of environmental concern[11]. These values are used in subsequent analysis of sector relationships and episodic event response.

4.2 The Pattern of Environmental Concern

The percentage of environmental articles over the 50-year study period produced a pattern best described as a recurring curve or cycle that has a rise in concern followed by an asymmetrical decrease in concern. Peaks of interest in years 1970, 1990, and 2000 (Figure 4.2) are followed by gradual declines. The pattern of percentage of environmental articles suggests that a low but stable level of environmental concern existed up until 1968 when there was sudden increase in public interest. An oscillating decline from 1970, with one major peak in 1981, brings an end to what is known as the first "green wave," or cycle of environmental concern. The second "green wave" begins following a relatively low percentage of environmental articles in the 1980s and completes its cycle in 1993. A third cycle of concern is observed to commence in 1998, peak in 2000, and decline until 2004. The amount of time between cycles appears to shorten throughout the study period.

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[11] "All magazines" refers to the 18 magazines sampled in this study.

Percentage of Articles in Popular Magazines Devoted to
Environmental Concern between 1956 and 2005
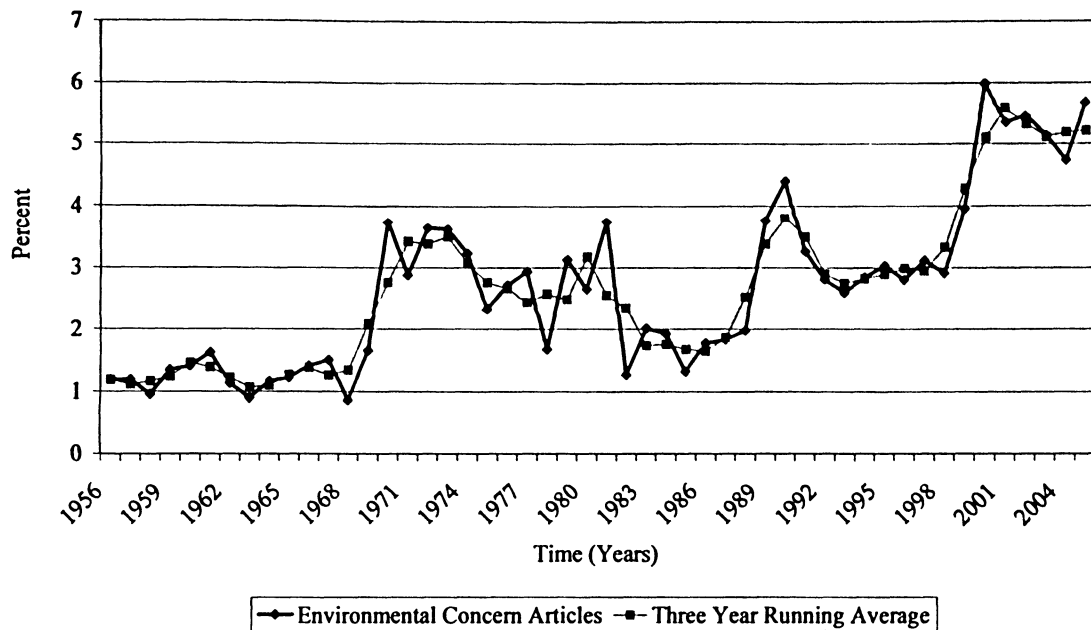
Figure 4.2 Percentage of articles appearing in the 18 sampled magazines
devoted to environmental concern. A three year running is displayed to
smooth the standardized data.

It could be argued that a fourth peak occurs in 1981, rivalling that of 1970, but

when a three year running average is plotted, it is evident that this is an isolated rise for

that particular year and the overall trend is declining. Using a set of regression lines

plotted at five year intervals for the period after 1970, it can be seen that the level of

concern declines at a slow rate, then levels off until 1981, where a small increase is

followed by a rapid decline (Figure 4.3). Therefore, the increase in environmental

concern in 1981 should not be considered an additional "green wave".

The subsequent decline after each peak suggests a gradual return to lower levels

of interest. However, each low concern period is higher than the previous low concern

period. These troughs in the cycle do not return to the original level before a rise in

Least Squares Lines for Pecentage of Environmental Articles between
1956 and 2005
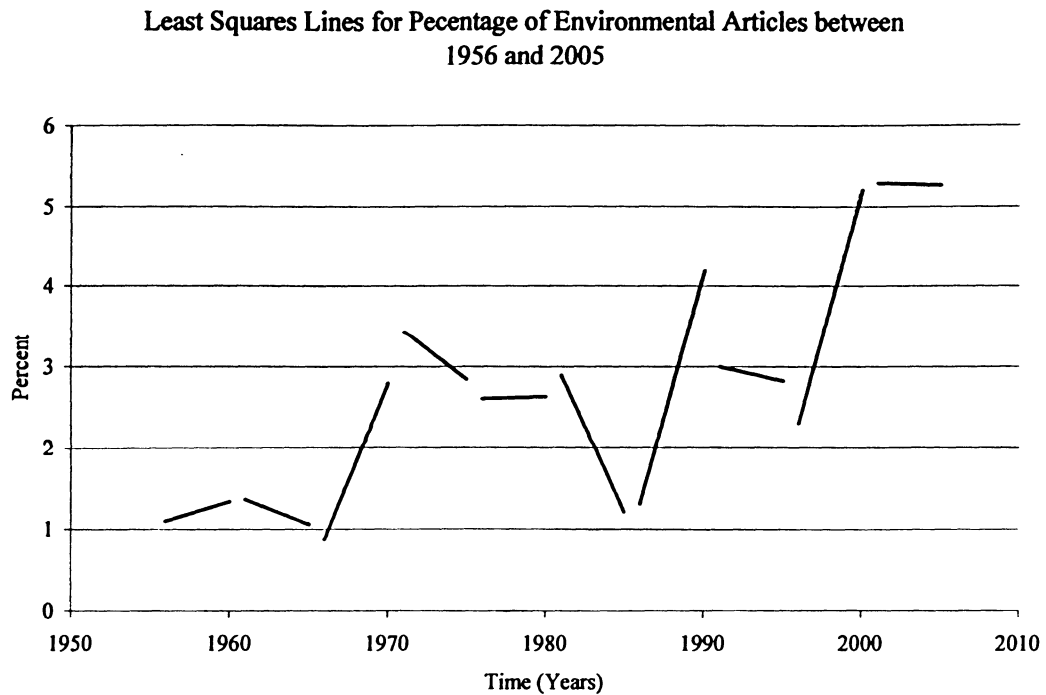
Figure 4.3 Least squares lines for five year segments using percentage of
publications devoted to environmental articles.

concern, indicating a new, higher base level of environmental concern from which each

"green wave" commences.

4.3 Curve Dissection by Sector

Over the study period, the increases in concern have not always been related to a

single environmental issue. To examine which issues have influenced the trend in

concern, each standard sector of environmental concern was isolated from the total to

determine its effect. Many of the sectors of environmental concern did not have

substantial influence on the overall environmental concern curve. For example, the

percentage of articles excluding those about pesticides in Figure 4.4 displays very little

variation from the total percentage of environmental articles. However, some isolated

Percentage of Publications Devoted to Environmental Articles Excluding *Chemical Contaminants-Pesticides* Articles between 1956 and 2005

Figure 4.4 *Chemical contaminants-pesticides* articles are isolated from the total percentage of environmental concern articles to investigate their contribution to the environmental concern cycle.

sectors exhibited strong weight at certain time periods, in particular, *climate change* articles and *resource depletion-energy* articles.

The issue of climate change grabbed public attention in the 1990s and increased in concern thereafter, making up a large portion of the environmental articles from 2000-2005 (Figure 4.5). Articles about energy were large contributors in the 1970s and 2000s—both periods of time were threatened by a fuel shortage with the OPEC embargo during the 1970s and realization that all of the easily accessible oil had been refined in the 2000s (Figure 4.6). However, in the latter part of the study period, most of the articles coded for *resource depletion-energy* dealt with alternative energy sources to help combat

Percentage of Publications Devoted to Enviornmental Articles Excluding
Climate Change between 1956 and 2005

Figure 4.5 *Climate change* articles are isolated from the total percentage of environmental concern articles to investigate their contribution to the environmental concern cycle.

Percentage of Publications Devoted to Environmental Articles Excluding
Resource Depletion - Energy Articles between 1956 and 2005

Figure 4.6 *Resource depletion – energy* articles are isolated from the total percentage of environmental concern articles to investigate their contribution to the environmental concern cycle.

climate change. Public interest has shifted to sources of sustainable energy, their practicality, and their implementation.

Interestingly, *wildlife-species* articles and *wilderness areas* articles have made consistent contributions to environmental concern over the entire study period (Figure 4.7 and 4.8). This may be explained in part by the relationships many people have with animals, and in turn, concern about their habitats. Conversely, this could be attributed to simple self-interest: if wildlife generally is considered the 'canary in the coal mine' of environmental quality, readers would be concerned with watching wildlife for impending effects on human populations.

Environment in general articles are responsible for a large portion of the peaks of environmental concern in 1970, 1990, and 2000 (Figure 4.9). This sector, as defined in Appendix A, is the public's overall concern that the quality of the environment is deteriorating. It is not surprising to see publication of these articles following the peaks of concern, as the public has already expressed concern about the environment on some level, and moved it up on the public agenda. The connections among environmental sectors are such that concerns generated in one area can have far-reaching effects on others; once the public "digests" information regarding a particular concern, the ramifications and impact on others begins to be recognized. It is interesting to note that the largest percentage of *environment in general* articles occurred in 1970 and their contribution to the subsequent waves of concern decreased during the study period (Figure 4.10). This could suggest that the first wave of concern represented the public beginning concerned with the general quality of the environment and as new

Percentage of Publications Devoted to Environmental Articles Excluding
Wildlife-Species Articles between 1956 and 2005
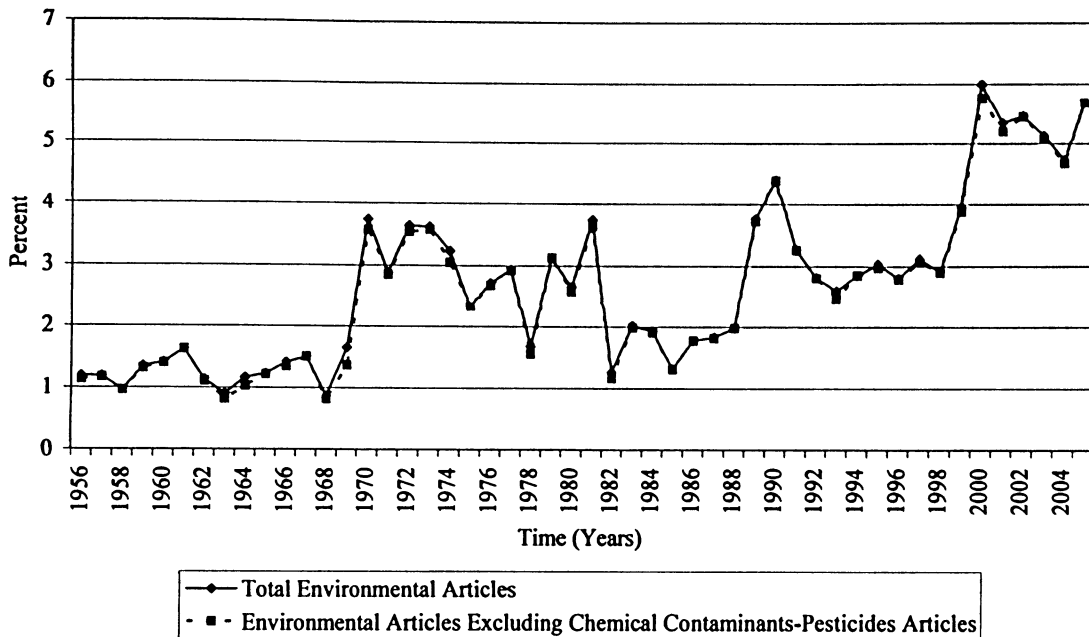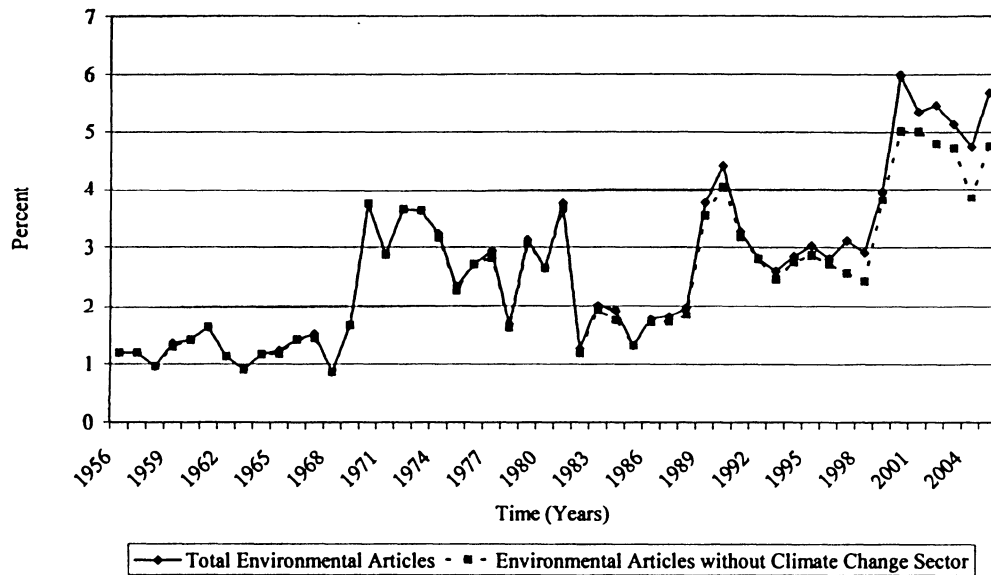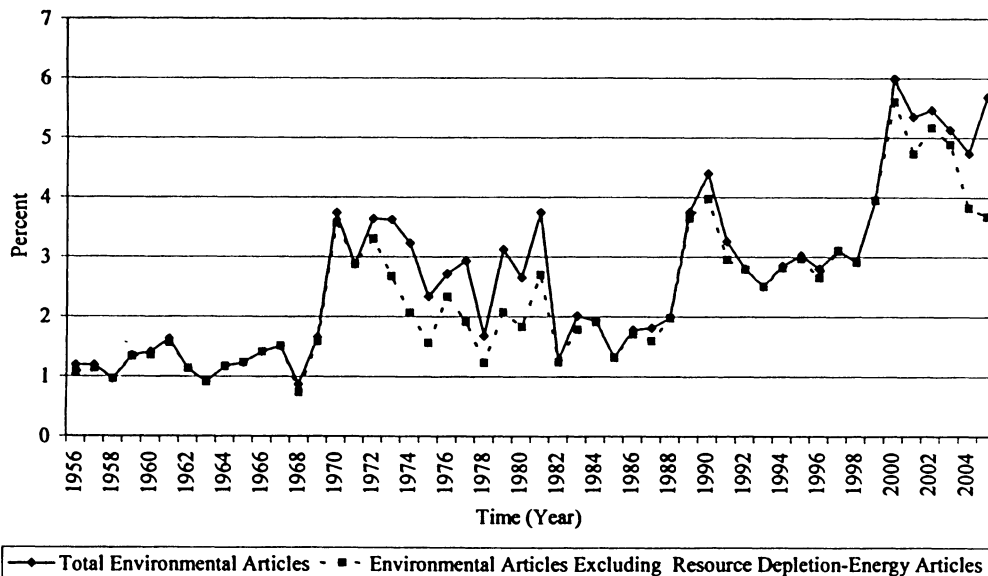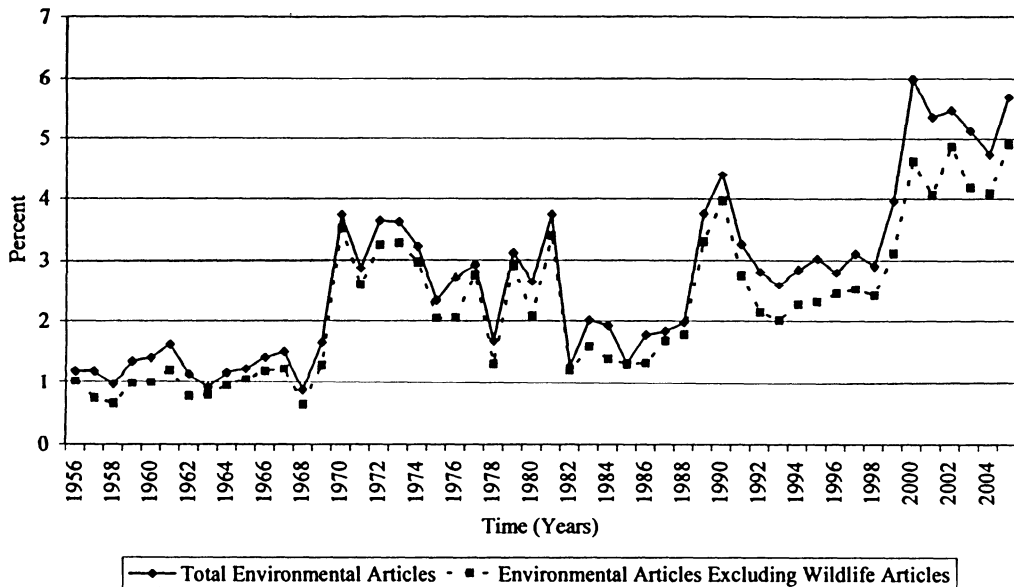

Figure 4.7 *Wildlife – species* articles are isolated from the total percentage of
environmental concern articles to investigate their contribution to the
environmental concern cycle.

Percentage of Publications Devoted to Environmental Articles Excluding
Wilderness Area Articles between 1956 and 2005
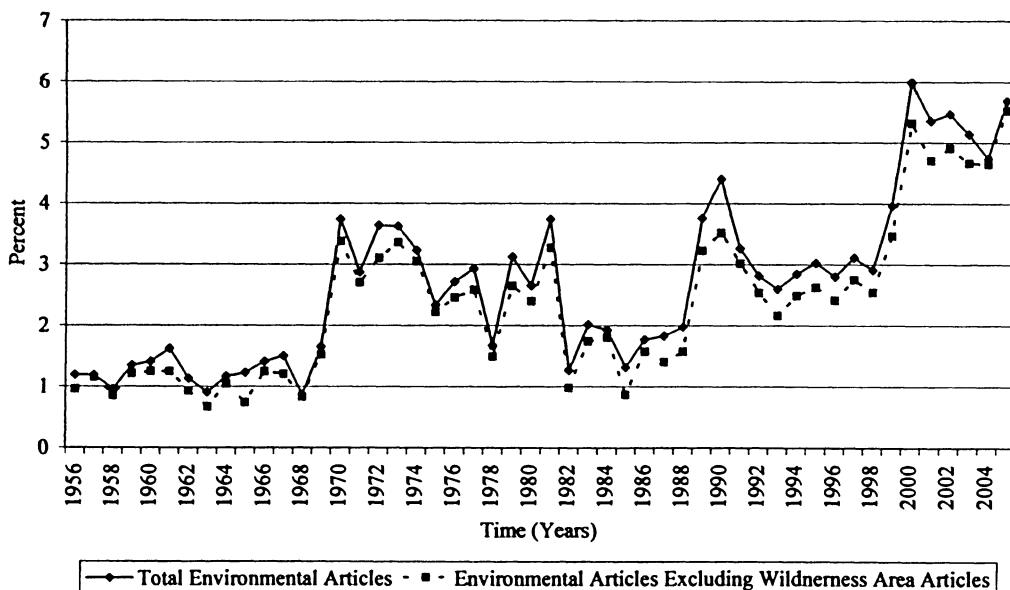
Figure 4.8 *Wilderness area* articles are isolated from the total percentage of
environmental concern articles to investigate their contribution to the
environmental concern cycle.

Percentage of Publications Devoted to Environmental Articles Excluding
Environment in General Articles between 1956 and 2005
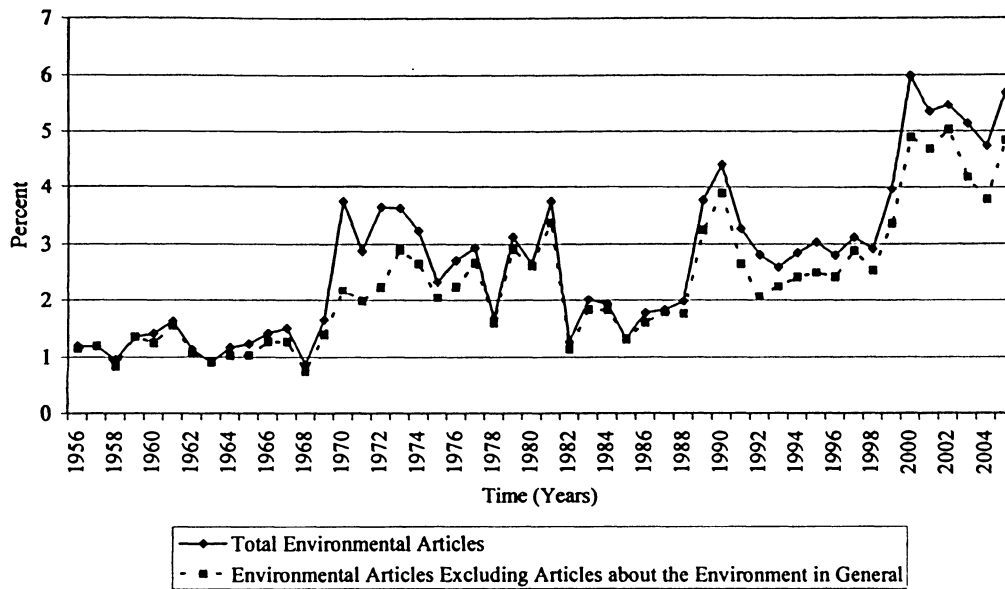
Figure 4.9 *Environment in general* articles are isolated from the total percentage
of environmental concern articles to investigate their contribution to the
environmental concern cycle.

Percentage of Publications Devoted to *Environment in General* Articles
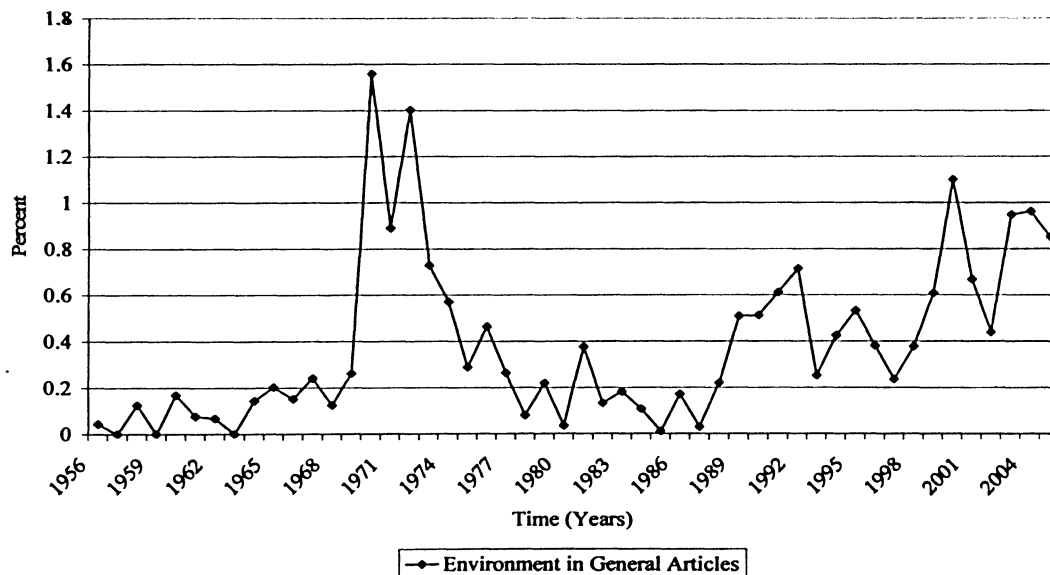
Figure 4.10 The percent of *environment in general* articles plotted from 1956 to
2005.

environmental issues arose during the study period the public was more focused on specific issues.

The influence of added sectors of environmental concern that were not in the public's awareness until the latter half of the study period on the trend in public concern was also investigated. This was done to ensure that the added sectors did not represent additional available content but an increased concern. These issues made up only about 1% of the environmental articles and did not change the overall pattern of environmental concern (Figure 4.11). Therefore, it is likely that these new issues are more indicative of current concerns and replaced older issues that ceased to exist.

Separation of Original and Added Sectors of Environmental Concern
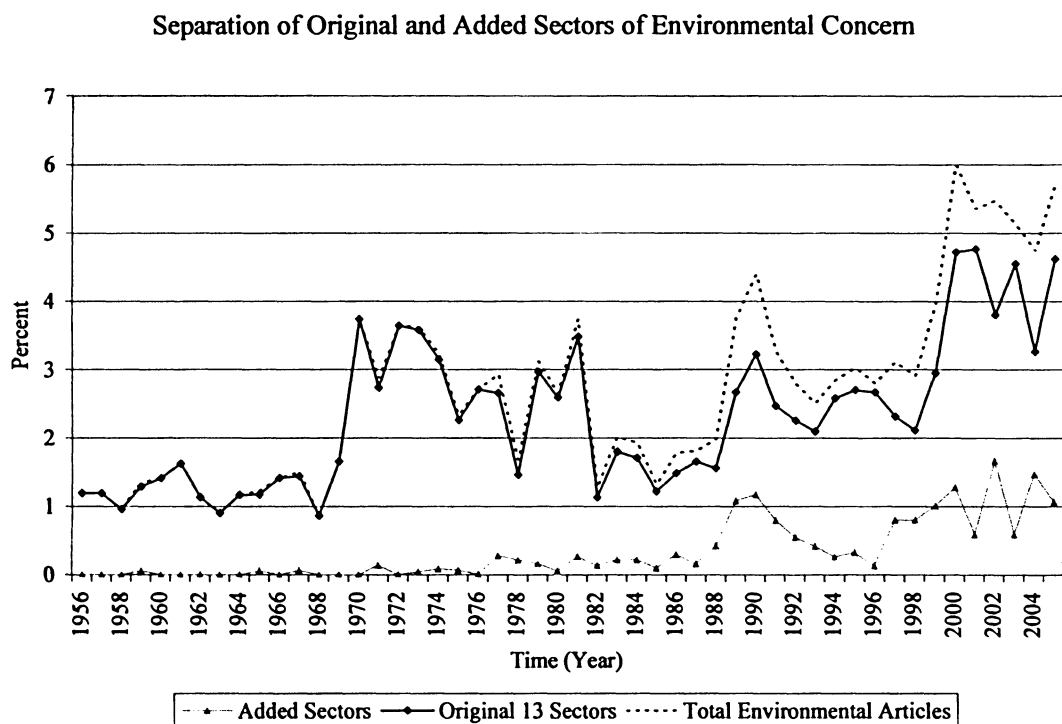
Figure 4.11 Added sectors of environmental concern were separated from the original 13 sectors used in Pushchak (1981) to investigate their influence on the environmental concern cycle.

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4.4 Intensity Index

Pushchak classified his intensity index into four categories; *very high*, *high*, *medium*, and *low* intensity. He found that the pattern of the intensity indexes was very similar to the pattern of environmental concern. When examining the pattern of *high intensity* articles with that of environmental concern, he found that both exhibited a period of low concern pre-1968 followed by a dramatic increase in 1969-1970 and a decline thereafter (p. 177). However, Pushchak noted that the peaks in each measure occurred at different times; the measure of environmental concern rose substantially in 1969, while the *high intensity* curve began its major increase in 1970. From this, he concluded that mass concern preceded intense media coverage.

When examining the intensity index created for this study, *very low*, *low*, and *very high* intensity categories followed the pattern of environmental concern (Figure 4.12). Those articles falling into the *very high intensity* category displayed peaks at 1970, 1990, and 2001, though not to the same frequency of *very low intensity* articles. The *very low intensity* articles have similar peaks, while the *low intensity* articles have a peak in 1970, 1981, 1990, but lack a strong peak at 2001. The *low*, *medium*, and *high intensity* articles all have increased frequency in the early 1980s. It appears that the major peaks occur during or just after peaks in the environmental concern trend. This supports Pushchak's conclusions that mass concern precedes intense media coverage. It is interesting to observe the large rise in *high intensity* articles at the end of the study period. This corresponds with a decrease in general environmental concern and could be attributed to the prominence placed on the relatively few articles appearing at that time. Obviously for the environmental articles that did make it into magazines during that time, they were

Presentation Intensity of Environmental Articles

Presentation Intensity of Environmental Articles

Very Low Presentation Intensity of Environmental Articles
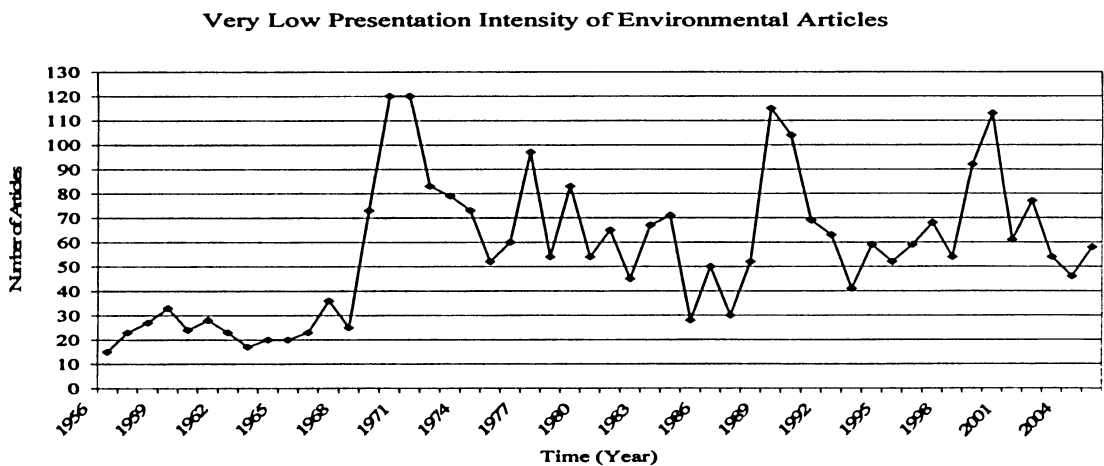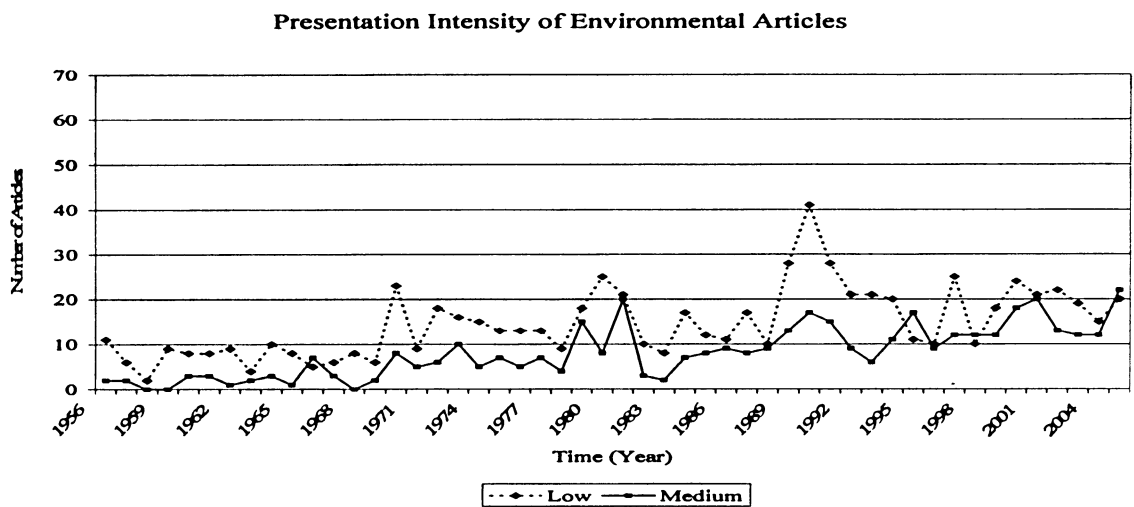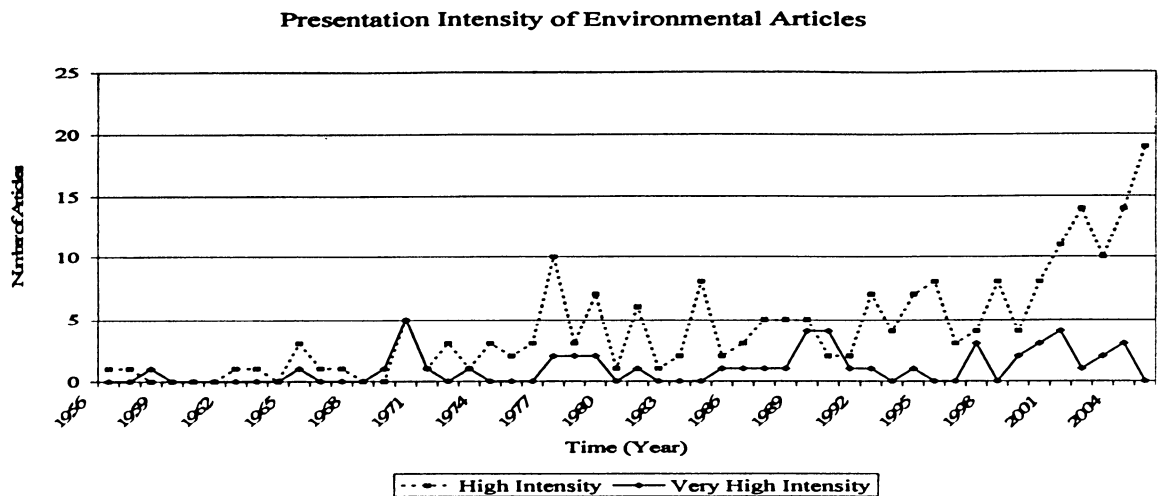
Figure 4.12 Frequency of very high, high, medium, low, and very low intensity
articles between 1956 and 2005. This intensity index measures the
importance placed on the article using audience attention grabbing
techniques.

given stronger prominence measures to attract attention to the issues. One can speculate that events of the day were overwhelming and that these articles were fighting to be on the public agenda.

4.5 Sector Relationships

Humans are able to care about many things simultaneously; therefore the public generally does not hold only one item on its agenda at a time. It is logical to conclude that certain environmental sectors may influence the rise or fall of others by pulling them onto or pushing them off the public agenda.

To examine the relationships between sectors of environmental concern, correlations between each standardized sector of environmental concern were conducted. No relationship was found between many of the sectors, but for those that did have a significant correlation ($p \leq 0.05$), a simple regression was performed to investigate the strength of the relationship. First, second, and third order regressions (using time, $time^2$, and $time^3$ respectively) were conducted with each standardized sector of environmental concern. Since this study does not investigate the influence of social or economic factors on environmental concern, time was added as an independent variable to account for cultural changes. It was left to the discretion of the researcher to determine which sector acted as the dependent variable and which acted as the independent variable in the regression analysis. This decision was based on the most logical relationship. For example, chemical contaminants in the environment are more likely to affect wildlife than wildlife having any effect on chemical contaminants.

The results of the sector regressions are summarized in Appendix F. Examination of the sector relationships was limited to those with an adjusted R^2 value greater than 0.30. For this study, relationships below this level are considered noise, since the models explain less than 30% of the variation. The equations of those relationships examined are listed in Appendix G.

Three clusters appear when examining adjusted R^2 values above 0.30: the variation in *wildlife* articles is explained by multiple sectors, the variation in *climate change* articles is explained by multiple sectors, and *air quality* articles explain the variation in *water quality* and *environment in general* articles.

The percentage of *wildlife* articles is positively influenced by the following sectors of environmental concern: *climate change, biodiversity, resource depletion-other, wilderness areas*, and most greatly by *chemical contaminant-other*. The least influence comes from that of *wilderness area* articles, where a 10% increase would relate to less than a 1% increase in *wildlife* articles when controlling for time. However, a similar increase in *chemical contaminant-other* articles would relate to a 9% increase in *wildlife* articles when controlling for time – the strongest relationship found. The relationships to the percentage of *wildlife* articles are not surprising; as suggested previously, many people look at the effects of environmental events on animals as indications of what might lie ahead for human populations. Contamination from chemicals, loss of resources, effects of climate can all negatively affect animals and, ultimately, humans. There is also a sociological factor in human affection for and interest in animals and their welfare, such as extinction, poaching, and suffering.

Climate change articles are influenced by *chemical contaminants-other*, *wilderness areas*, and *resource depletion-energy* sectors. However, for *wilderness areas* and *chemical contaminants-other*, the relationship is negative, meaning that an increase in articles for those sectors of environmental concern shows a decrease in the percent of *climate change* articles. The strongest of the two is *chemical contaminants-other*, where a 10% increase would relate to a 1.6% decrease in climate change articles when controlling for time. These decreases could be attributed to competition between the sectors. It could be theorized that contamination by chemicals can have direct health implications while climate change does not have visible health effects for many people. The effects of climate change are more gradual and do not pose an immediate threat, whereas chemical contamination has been positively associated with many diseases, including cancer, asthma and autoimmune disorders.

The percentage of *climate change* articles, conversely, is positively related to the percentage of *resource depletion-energy* articles. The issue of climate change has received much more attention and study over the past few decades. The burning of fossil fuels has been found to be a major contributor of increased green-house gases and is attributed as the chief cause of climate change. The variation in *climate change* articles explained by *energy articles* could be attributed to the connection made between fossil fuels and climate change. However, since the issue of climate change did not appear in the general realm of public discourse until the late 1980s, it can be assumed that this relationship is associated with the later part of the study period and not the energy articles during the 1970s in which the OPEC embargo was a main issue of concern.

Air quality was found to have a positive relationship with *water quality* and *environment in general*, both at considerable levels. A 10% increase in *air quality* articles relates to a 6.5% and 14.4% increase in *water quality* and *environment in general* articles, respectively, when controlling for time. Of particular interest is the variation in the *environment in general* sector where it appears that as people become more concerned with air quality, that there is an increase in concern about the general quality of the environment. This is not to say that concern for air quality causes concern for the environment but that this is the only sector to have a relationship with the general concern for the environment.

Generally, these results indicate that many sectors of environmental concern act independently while a select few can be associated with another sector.

4.6 Episodic Events

Logic suggests that environmental concern does not appear spontaneously, and should in fact rise in response to an event. If the assumption of a delay in time between the occurrence of an event and changes in environmental concern is true, testing event frequency against a delayed (lagged) standardized environmental concern should produce superior test results than testing with no delay. For this study, it is expected that the delay in response for physical events will be very short, while the delay in response for non-physical events will be longer.

To investigate the response of public environmental concern to episodic events a key word search of the *New York Times* produced a list of 1120 episodic events. A multivariate regression analysis was performed to investigate the relationship between the

type of event and environmental concern. The frequency of episodic events, along with time, was tested against lagged standardized levels of environmental concern. The lagging of concern was limited to 5 years in order to keep a sufficient number of observations in the calculation and examine a reasonable length of influence.

Both physical and non-physical events explain some of the variation in environmental concern in the first year, at lag 0 (Table 4.1). However, the highest adjusted R^2 value appears in lag 0 and proceeds to decrease with added lags. These results differ from those of Pushchak; using correlation coefficients, he found that there was a delay for non-physical events. He found a short delay of 1 year was discovered for response events (non-physical) while no lag improved the coefficients for unintentional events (physical). He concluded that the effects of unintentional events (such as oil spills or air inversions) on environmental concern are short-lived, occurring only in the year in which they occur. However, the effect of response events, such as protests or legislation, is longer lasting, affecting levels of environmental concern in the following year.

To examine the response to physical and non-physical events more closely, the events were broken down into the defined sectors of environmental concern. The frequency of events in each sector was analyzed against time and the standardized levels of environmental concern for that sector. The analysis of physical events proved to be difficult, as many sectors did not have any events recorded. However, of those sectors that were significant and had events, *wildlife-species* and chemical *contaminants-other* had adjusted R^2 values over 0.30 and occurred in lag 5 and lag 0, respectively (Table 4.2). In non-physical events, the same sectors, along with *climate change, biodiversity* and *environment in general* also achieved adjusted R^2 values over 0.30 (Table 4.3). The only

Table 4.1 Physical and Non-Physical Events Lagged Against the Standardized Percentage of All Environmental Articles When Controlling for Historical Time

	Lag 0	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
Physical Events	<u>(0.554)</u> *0.000* 0.020	(0.544) *0.000* 0.020	(0.515) *0.000* 0.000	(0.506) *0.000* -0.015	(0.501) *0.000* -0.020	(0.546) *0.000* -0.043
Non-Physical Events	<u>(0.556)</u> *0.000* 0.043	(0.547) *0.000* 0.047	(0.516) *0.000* -0.008	(0.500) *0.000* -0.020	(0.489) *0.000* 0.025	(0.482) *0.000* -0.036

Note: Each cell contains the adjusted R^2 values are in brackets, the prob (F) in italics, and the slope coefficient. The highest adjusted R^2 value for each sector is bolded and those that were above 0.30 are underlined.

sectors where a lag had any improvement on the adjusted R^2 value were *wildlife-species* and *biodiversity* where a lag of 5 and lag of 4 produced the highest R^2 values, respectively. It is interesting to find that the addition of a delay in response to non-physical events only improved the results for two sectors of environmental concern. However, when examining the slope coefficient for the delayed responses, the effect on concern is very low – less than 1%.

Overall, even where a relationship occurs between episodic events and sectors of concern, events do not have any substantial effect on public concern, as measured by magazine articles. In Pushchak's work, lagging the event data produced stronger results for non-physical events. However, this was not the case in my study. When examining the slope coefficient, the results found that lagging the events does not produce any change in response; all are less than 1% even with a 10% increase in event frequency, though the adjusted R^2 values improve for a few sectors. These differing results could relate to the length of time periods studied. A response to non-physical events may appear during short study periods, such as Pushchak's, while a longer time frame (50 years) does not find a delay in response to either physical or non-physical events. As well, the publication cycle for news stories and magazines has changed – competition

requires information and stories to make it to print faster than compared to previous

decades (Klinenberg, 2005, p. 54). This could support why no annual lags were

discovered. Overall, for this study, events were not been found to be strong predictors of

environmental concern.

.

Table 4.2 Multivariate Regression Analysis Using Standardized Sectors of Environmental Concern and Frequencies of Physical Events While Controlling for Historical Time

	Lag 0	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
Air Quality	NS					
Water Quality	(0.258) 0.000 0.001	(0.128) 0.016 0.000	NS	(0.101) 0.036 0.001	NS	NS
Chemical Contaminants-Pesticides	NS	NS	NS	NS	NS	NS
Chemical Contaminants-Other	(0.311) 0.000 0.000	(0.302) 0.000 0.000	(0.293) 0.000 -0.001	(0.296) 0.000 -0.001	(0.279) 0.000 -0.001	(0.287) 0.000 -0.002
Wildlife-Species	(0.350) 0.000 -0.001	(0.337) 0.000 -0.000	(0.361) 0.000 0.000	(0.375) 0.000 0.008	(0.379) 0.000 -0.001	(0.411) 0.000 0.003
Wilderness Areas	(0.200) 0.002 -0.001	(0.205) 0.002 -0.017	(0.189) 0.003 -0.032	(0.145) 0.012 -0.007	0.125 0.021 0.009	(0.118) 0.027 -0.023
Environment in General	NER					
Waste	NER					
Human Population	NER					
Radioactivity	(0.091) 0.034 0.006	NS	NS	NS	NS	NS
Resource Depletion-Energy	NER					
Resource Depletion- Other	NER					
Noise	NS	NS	NS	NS	NS	NS
Sustainability	NER					
Biodiversity	NER					
Environmental Industry	NER					
Climate Change	NER					
Ozone Depletion	NER					

Note: Each cell contains the adjusted R^2 values are in brackets, the prob (F) in italics, and the slope coefficient. The highest adjusted R^2 value for each sector is bolded and those that were above 0.30 are underlined.

NS: Not significant at the 5% level
NER: No events recorded

Table 4.3 Multivariate Regression Analysis Using Standardized Sectors of Environmental Concern and Frequencies of Non-Physical Events While Controlling for Historical Time

	Lag 0	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
AQ	NS	NS	NS	NS	NS	NS
WQ	(0.128) 0.015 0.001	(0.126) 0.017 0.002	**(0.168)** 0.006 0.004	NS	NS	(0.097) 0.044 0.004
PEST	NS	NS	NS	NS	NS	NS
CHEM	**(0.343)** 0.000 0.003	(0.310) 0.000 -0.002	(0.291) 0.000 -0.001	(0.286) 0.000 -0.002	(0.273) 0.000 -0.002	(0.246) 0.001 0.000
WL	(0.357) 0.000 -0.006	(0.357) 0.000 -0.009	(0.387) 0.000 -0.012	(0.365) 0.000 0.001	(0.379) 0.000 -0.000	**(0.419)** 0.000 -0.009
WA	(0.200) 0.002 0.001	(0.229) 0.001 -0.010	**(0.230)** 0.001 -0.014	(0.152) 0.010 -0.005	0.219 0.002 0.017	(0.114) 0.030 -0.005
ENVG	**(0.333)** 0.000 0.019	(0.206) 0.002 0.013	(0.169) 0.006 0.012	NS	NS	NS
WAST	**(0.177)** 0.004 -0.006	(0.088) 0.045 -0.002	(0.115) 0.024 0.003	(0.010) 0.037 0.003	(0.141) 0.014 0.005	(0.103) 0.039 0.004
HP	NS	NS	NS	NS	NS	NS
RAD	NS	NS	NS	NS	NS	NS
ENER	(0.126) 0.016 0.031	NS	NS	NS	NS	NS
RDO	**(0.264)** 0.001 0.017	(0.157) 0.007 0.003	(0.198) 0.003 -0.012	(0.190) 0.004 -0.008	(0.216) 0.002 0.011	(0.192) 0.004 0.009
NOI	NS	NS	NS	NS	NS	NS
SUS	(0.215) 0.001 -0.013	(0.211) 0.002 -0.010	**(0.256)** 0.000 0.030	(0.226) 0.001 0.020	(0.207) 0.003 0.008	(0.218) 0.002 -0.017
BIOD	(0.244) 0.001 -0.002	(0.294) 0.000 -0.013	(0.247) 0.001 -0.004	(0.289) 0.000 -0.012	**(0.342)** 0.000 0.018	(0.244) 0.001 -0.003
ENVI	NS	NS	NS	NS	NS	NS
CC	**(0.500)** 0.000 -0.023	(0.462) 0.000 0.004	(0.486) 0.000 -0.018	(0.486) 0.000 -0.017	(0.486) 0.000 -0.012	(0.489) 0.000 0.013
OZ	NS	NS	**(0.265)** 0.000 0.013	NS	NS	NS

Note: Each cell contains the adjusted R^2 values are in brackets, the prob (F) in italics, and the slope coefficient. The highest adjusted R^2 value for each sector is bolded and those that were above 0.30 are underlined.

NS: Not significant at the 5% level

You have to know the past to understand the present.
-Sir Winston Churchill (as quoted in Costain & Lester, 1995)

As a result of this comprehensive longitudinal study, it has been found that

environmental concern follows discernable cycles. Three observed waves of peak

environmental concern occur in 1970, 1990, and 2000, representing public discontent

with environmental quality at those times. The reoccurrence of waves of concern can

represent the public responding to new environmental issues, responding to a decrease in

environmental quality, or expressing dissatisfaction with the environmental

policies/protection of that time period. It does, nonetheless, confirm the notion that the

environment is one of a group of issues that becomes "a permanent part of the formal

agenda, appearing at recurring intervals but never being fully resolved" (Cobb & Elder,

1972, p. 157). What is interesting to note is the apparent decrease in time between cycles

during the study period. The public is obviously becoming interested in the environment

more often. The issue of environmental quality is taking precedence with the public, and the decrease in time between cycles could be representative of the public recognizing that environmental quality is decreasing rapidly and that response is more urgently needed.

5.1 Issue Attention Cycle Revisited

The pattern of environmental concern described in Chapter 4 shows that the level of concern never returns to zero and exhibits a clear ratcheting upward in a step-like pattern whereby the end of one cycle is higher than its beginning and the subsequent cycle builds from the end point of the previous cycle. The results of this study support the first hypothesis, proposed in Chapter 2, which states that a decline in issue attention never returns to the original level of attention, that of the *pre-discovery stage,* in Downs' (1972) "issue attention cycle". With each rise in environmental concern, political leaders respond to the public's intense interest or dissatisfaction. The governmental responses, such as legislation or program development, institutionalize the environment in society, helping to create a new and higher base level of concern. Institutionalization of the environment in society inhibits the attention level from entering the *post-problem stage* and declining to the original *pre-discovery stage* level as described by Downs. Dunlap (1995) remarked that

> Downs did not foresee the degree to which concern about the environment would become institutionalized though society, thereby avoiding the fate of most fleeting social problems, and that environmentalism would become one of the most significant social movements of the twentieth century. (p. 98)

The cyclical nature of the issue means that it will ultimately undergo periods of disinterest and low levels of concern, but it also means that these periods will be followed

by increased concern. In *The Death of Environmentalism*, Shellenberger and Nordhaus (2004) argued that the lack of public outcry over recent anti-environmental actions by the U.S. government was proof that environmentalism died. It is interesting that Shellenberger and Nordhaus came to such a dramatic conclusion based on limited empirical evidence. Examination of the past reveals that concern for the environment follows discernable cycles with regular lows and highs. It is understandable that they would assume people to be ambivalent about (or distracted from) the environment following the terrorist attacks on the United States in 2001, but in this instance, the lack of reaction by the public can be explained by fears for personal security taking priority over concern for the environment. According to Maslow (1970), once this occurs, people are unable to reach the final stage in their "Hierarchy of Needs". That is, a threat to personal security inhibits people from looking beyond their own immediate well-being; this of course includes concern for the environment. When speaking about the terrorist attacks, Brechin and Freeman (2004) point out that "under this perceived threat national security issues by definition trump the public's concerns over the environment" (p. 13). The events of 9/11 and the subsequent "War on Terror" monopolized the public agenda, and diverted the public's attention from environmental issues by having people constantly wary of a threat to their personal security. However, it is important to point out that even as the "War on Terror" continued and national security alerts were still issued, concern for the environment rose in 2005. This helps to demonstrate the cyclical nature of environmental concern and its potential for rejuvenation as an issue and perhaps Shellenberger and Nordhaus were premature in predicting that environmentalism had died.

5.2 Sector Relationships

As previously discussed, this study makes the assumption, following Cobb and Elder (1972), that the public agenda can hold more than one item at a time, and that environmental concern can translate into attention toward more than one issue. This thesis proposed that public attention to the environment is not limited to individual sectors of concern; an increase in attention to one sector should involve concomitant increases in attention in other sectors. Results indicate that this is the case for certain environmental sectors but not all. This study found that certain sectors, namely *wildlife-species* and *climate change* related to other sectors of concern and *air quality* was an area of concern that had a positive relationship with both *water quality* and *environment in general*. Since these appear to be the only sectors where relationships exist, the remaining sectors can be considered to be independent of each other. These results are similar to those of Van Liere and Dunlap (1981) who designed a model to test whether different sectors of environmental concern or "substantive issues" were inter-correlated. Van Liere and Dunlap (1981) concluded that concern for different sectors rose and fell at different times, and many tended to act in isolation of others. It can be concluded that a relationship exists between some sectors; however, not all are influenced by other sectors of environmental concern. Possible explanations for these findings may relate to the characteristics of the individual sector and could include, but are not limited to, the following:

- whether negative environmental issues in that sector pose human health effects
- whether the sector is driven by catastrophic events such as industrial accidents or chemical spills

- whether the negative environmental issues in that sector are visible in nature

- whether negative issues in that sector affect individuals or the population as a whole

The definitive reasons for sector relationships are outside the scope of this study but provide an excellent opportunity for future investigations into sectoral variations.

5.3 Complexity of Environmental Concern

This study clearly confirms that the public's concern for the environment is complex. The rise and fall of concern appears to follow a discernable cycle and is not predicted by episodic events. Birkland (1998) argued that physical events, or "focusing events" as he called them, had the ability to restart Downs' "issue-attention cycle". In his study, he found that these events helped raise public awareness of issues and argued that putting them on the public agenda would then lead to policy change. Governmental reform and policy change do follow raised public concern for an issue; however, this study did not find that episodic events were a good predictor of environmental concern. The hypothesis that the type of event would have a predictable public response was not supported by the results in this study. Though a relationship between episodic events and environmental concern was found, it was not to the strength as discovered in Pushchak's (1981) work. Overall, it is not the occurrence of events alone that causes an issue to rise on the public agenda, although it may be a contributing factor. These results support the work of Ader (1995), who found no relationship between events and public concern. Ader found no relationship between the salience of environmental problems on the public agenda and the statistical trends for three different "reality" measures of air, water, and

waste pollution. The complexity of environmental concern has been investigated from multiple angles: social basis, event response, and media influence (Ader, 1995; Greenbaum, 1995; Soroka, 2002). However, no single explanation has been determined and it must be concluded that environmental concern is influenced by multiple factors and is much more a part of the popular and complex agenda-setting process.

Investigation into these factors would provide interesting results when using a measure of environmental concern that extends over a long period of time. The measure of environmental concern used in this study can act as a useful resource for future investigations. Many of the results in other studies have been limited by short study periods, and future investigations should have a study period that includes all three "green waves".

5.4 Consequences for Future Environmental Policy Responses

Elected governments respond to public concern (Rosenbaum, 1977; Soroka, 2002). The reoccurrence of public concern for environmental quality suggests that the government's protective measures (legislation, programs, etc.) are not meeting the public's aspirations. It may also suggest that new environmental issues have presented themselves that the public does not feel have been addressed by existing government measures. With each rise in concern, the public is calling for the environment to be placed higher on the political agenda.

Environmental concern seems likely to continue rising for the foreseeable future; parties from across the political spectrum will have to incorporate questions about the environment into debates and platforms. Whether they seek to protect or exploit it,

environmental quality will not soon disappear from the public agenda. If the pattern continues and the environment is an issue that reoccurs more frequently and with more intensity, policy-makers should expect environmental protection to become a fixture in government priorities, similar to health care, education, and national security. There is no sense debating the rules of the game without a field in which to play: the environment is the physical arena in which all other aspects of statecraft unfold, including the hospitals in which we deliver our health care, the schools in which we teach our children, and the lands that we protect.

5.5 Further Research

One of the main difficulties in using these collected data was defining limits to the research: what fell into the scope of the current study and what had to be left to future research. The size of this data set, and the potential it offers to examine environmental concern over a long period of time, is a blessing and a curse: there is a constant temptation to explore new questions, relationships, and trends. Many interesting questions were left unanswered because they fell outside the three defined hypotheses, or the scope of this thesis; they will have to be left to future research.

Possible future study includes an examination of the relationship between socio-economic factors and environmental concern. It is evident that concern for the environment is a complex issue and influenced by multiple factors. Demographic variables have been investigated in the past with the use of survey data, but not over a 50 year time period, capturing all three cycles of environmental concern (Van Liere &

Dunlap, 1980). Investigation into Inglehart's (1971) theory of post-materialism and the observed trend in public environmental concern could also be a further avenue for study.

There is an opportunity to extend the time period examined using this measure of environmental concern to investigate the cyclicality of environmental concern further. A longer study period would provide more evidence that the time between cycles has decreased and if generational values have any influence over cyclicality of environmental concern, such as Schlesinger's (1949) alternation between national political moods.

Investigation into the levels of public concern required to pass environmental policies or legislation would also be of interest. Many policies are proposed responding to public outcry; why do some make it through the rigorous process of passage into law and others do not? Does public concern need to be at a certain level for proposed legislation to become law?

Levels of environmental concern have been found to vary over time. However, it is unknown what level of concern is required to influence individual behaviour change. What does it take to translate environmental concern into action?

Appendix A Definitions of Environmental Sectors

The following are definitions for environmental categories of mass-circulation magazine articles.

1. Air Quality: Articles suggesting that air was not fit to breathe or that health and aesthetic problems existed. Subjects in this category included smog, sulphur dioxide, particulates, or other polluting substances. Also included were sources of air pollutants such as industry, automobiles, and natural sources.

2. Water Quality: Articles which indicated deteriorating water quality and its threats to human health, aesthetic and recreational deterioration or economic costs. Subjects included municipal and industrial effluents, thermal pollutants, among others.

3. Chemical Contaminants-Pesticides: Articles that discussed pesticide compounds introduced into the environment as a threat to species or to human health. Subjects included contaminant movement in the food chair, concentration, and effects on various species.*

4. Chemical Contaminants-Other: Articles that discussed general (non-pesticide) chemical compounds introduced into the environment as a threat to species or human health. Subjects included mercury compounds, PCB's, Salts, and other toxic materials.

5. Wildlife-Species: Articles that discussed the extinction or threat to wildlife species, the nature of the threat, and the value of wildlife in natural systems. Subjects included threats to whale populations, terrestrial wildlife (alligators, mountain lions) avian wildlife (eagle, condor, whooping crane) and aquatic wildlife (salmon, trout, cod) and others.

6. Wilderness Areas: Articles that discussed the threats to wilderness areas from development, mining, transportation and other human activities. Subjects included the importance of wilderness for aesthetic and psychological reasons and the role of wilderness in other ecological processes (flood control, water recharge and species habitat).

7. Environment in General: Articles in this category expressed a comprehensive concern for the environment that many environmental sectors were deteriorating simultaneously, that the contributing factors were related and the results interdependent. (This category was not used as an "other" category to capture articles not easily coded in one of the other 12 categories; rather its purpose was to monitor a significant comprehensive view of the environment). Subjects included Earth Day articles, the 1972 environment sectors as being related with no one sector being primary.

8. Waste: Articles in this category expressed concern about increasing amounts of waste generated as by-products of production or consumption, the problems of waste disposal, and the environmental consequences of increase waste generation. Subjects included waste types, (solid and liquid) waste sources (individual, municipal and industrial) and waste disposal problems, such as the diminishing availability of land fill sites, leaching, vermin, and aesthetic impacts.

9. Human Population: Articles in this category dealt with the environmental consequences of increasing human population (demand for resources, growth of cities, pressures on wilderness areas) and ways of dealing with population problems (birth control altered settlement patterns, and others).

10. Radioactivity: Articles that discussed the presence of radioactive contaminants in the natural environment (air, water, plants, animals) their sources and consequences for human health. Subjects included fallout, trace contaminants, their location and sources, (articles about nuclear power or weapons tests were not included unless they discussed environmental impacts).

11. Resource Depletion-Energy: Articles which discussed the diminishing supply of energy resources (oil, coal, hydro electric power) as a result of growing demand, finite resources, rates of use, alternate energy sources, and possible need for energy conservation.**

12. Resource Depletion-Other: Articles which discussed diminishing supply of non-energy resources (metals, lumber, food, minerals, and others) as a result of growing demand, finite resources, rates of use, and possible need for energy conservation.

13. Noise: Articles in this category discussed sound as a factor diminishing the physical and aesthetic quality of the natural environment for humans and wildlife. Subjects included noise sources (aircraft, automobiles, industry) and aesthetic and physical impacts.

14. Sustainability: Articles in this category discussed human management practices to avoid depleting natural resources to a level beyond recovery. Subjects included methods of farming, water consumption, and fuel use to ensure continued use over a long period of time.

15. Biodiversity: Articles that discussed the threats to biodiversity and not one single species. Threats could include loss or fragmentation of wilderness areas from human activities. Subjects included the importance of multiple species to a certain wilderness area and the role they play in maintaining balance in the ecosystem.

16. Environmental Industry: Articles in this category dealt with the industry devoted to developing or using technology to improve or decrease impact on the

environment. Subjects include the recycling industry, environmental marketing, and new car and technology developments to decrease negative impacts on the environment.

17. Climate Change: Articles which indicated harm from or discussed the effects of climate change, global consequences of increased green-house gases, and proposed solutions to combat climate change. Articles that discussed global warming were included in this sector. Subjects included unusual weather thought to be attributed to climate change, effects of rising temperatures, and the Kyoto Protocol.

18. Ozone Depletion: Articles in this category dealt with the environmental consequences, human and environmental, of ozone depleting substances and methods of management and elimination of these chemicals.

* Pesticide (3) articles were collected separately from other contaminants because of its prominence in the environmental policy literature, particularly Rachael Carson's book in the early 1960's.

** Energy (11) articles were collected separately from other resources because of the importance of energy in the 1979s and latter part of the study period.

Source: Modified from Pushchak (1981), p. 141.

Appendix B Content Coding Sheet

Name of Journal: _____

Date: _____

Article title: _____

Intensity Measures

Article length (pages)   Article position (from the front)   **4.** Top cover billing plus photo
                                                                   3. Top cover billing or photo
                                                                   2. Cover billing or index note
Issue length (pages)   Number of periodical articles   **1.** No cover billing / n.a.

Content Measures

Sector of environmental concern	**Scope of problem presented**	**Solution**
1. air quality	1. global	1. none indicated
2. water quality	2. national	2. education/study
3. chemical contaminants—pesticides	3. state/regional	3. economic
4. chemical contaminants—other	4. local	4. political
5. wildlife—species	5. none	5. individual behaviour
6. wilderness areas	6. international	6. collective behaviour
7. environment in general		7. technological
8. waste		8. biological/ecological
9. human population		9. institutional
10. radioactivity		10. legal
11. resource depletion—energy		11. planning
12. resource depletion—other		12. multiple solutions
13. noise		13. no solution (i.e., no problem identified)
14. sustainability		
15. biodiversity		
16. environmental industry		
17. climate change		
18. ozone depletion		

Summary of Article Story

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Appendix C Prominence Measures

Article Length: a measure of the article length in pages compared with the total length of the magazine in pages.

Article Position: the position of the article in the sequence of articles number from the front cover.

The Significance of the Article: Indicated by format measures intended to draw the readers attention. These measures were divided into four categories:

1. Top Cover-Billing Plus Photo – Article title and photo associated with the article appear on the cover of the magazine. This formatting device receives a score of 4 when calculating the intensity index.
2. Top Cover-Billing or Photo – Article title or a photo associated with the article appear on the cover of the magazine. This formatting device receives a score of 3 when calculating the intensity index.
3. Cover-Billing or Index Note – Article title, description or photo appear on the pages of the table of contents outside of the list of all articles appearing in the magazine. This formatting device receives a score of 2 when calculating the intensity index.
4. No Cover-Billing – No additional formatting done to draw attention to the article outside of listing of all articles appearing in the magazine (table of contents). This formatting device receives a score of 1 when calculating the intensity index.

Source: Modified from Pushchak, 1981, p. 116.

Appendix D Physical and Non-Physical Episodic Event Key Word Combinations

Search words used to compile episodic events reported in the *New York Times* were based on the sectors of environmental concern.

Oil + Spill*
Oil + Leak
Air + Pollut*
Air + Inversion*
Water + Pollut*
Water + Contaminat*
Pesticide + Pollut*
Pesticide + Contaminat*
Chemical + Contaminat*
Chemical + Spill*
Species + Loss
Wilderness + Loss
Wilderness + Destruction
Waste + Problem
Garbage + Problem
Population + Human + Increase*
Population + Human + Decrease*
Radiation + Exposure
Radiation + Accident
Energy + Depletion
Resource + Depletion
Noise + Pollut*
Biodiversity + Loss
Biodiversity + Endang*
Environment* + Protest
Environment* + Report
Environment* + Report + United Nations
Environment* + Conference*
Environment* + Conference* + United Nations

Note: The asterix (*) denotes all possible endings of the word. For example when contaminat* is entered, possible words retrieved will include contamination, contaminates, contaminated, contaminating, and so on.

Appendix E Total Paid Circulation and Single Copy Sales from June – December [a]

	Year			
	2002	**2003**	**2004**	**2005**
Atlantic Monthly	529,834	494,067	424,797	395,620
Better Homes and Gardens	7,607,832	7,606,820	7,626,088	7,607,694
Canadian Business	82,806	82,174	82,084	85,508
Canadian Forum	*ENDED IN 2000 AND REPLACED BY HARROWSMITH COUNTRY LIFE*			
Canadian Geographic	227,799	212,003	222,693	215,209
Esquire	740,204	718,898	712,683	708,774
Fortune	867,781	887,935	874,284	869,665
Harper's	229,434	228,955	229,204	226,425
Harrowsmith Country Life	122,131	125,138	125,539	125,398
Ladies Home Journal	4,101,414	4,102,373	4,120,087	4,112,010
MacLean's	445,022	425,404	401,080	369,486
McCall's	*ENDED IN 2001 AND REPLACED BY BETTER HOMES AND GARDENS*			
National Geographic	6,657,424	6,602,650	5,475,135	5,376,750
Playboy	3,213,638	3,045,244	3,051,344	3,005,753
Reader's Digest - US	11,944,898	11,044,694	10,081,577	10,094,602
Reader's Digest - Can	1,000,826	955,145	926,461	935,320
Scientific American	688,850	687,908	589,232	580,071
Sports Illustrated	3,245,940	3,210,040	3,324,631	3,238,101
Time-Can	240,235	230,158	230,400	231,384
Time-US	4,109,962	4,112,311	4,034,061	4,026,891
Total Circulation	46,056,030	44,771,917	42,531,380	42,204,661
Population Canada[b]	31,372,600	31,676,100	31,989,500	32,299,500
US[c]	288,125,973	290,796,023	293,638,158	296,507,061
Total North American Population	319,498,573	322,472,123	325,627,658	328,806,561
Circulation as Percent of Population (%)	14.42	13.88	13.06	12.84

Source: [a]Audit Bureau of Circulation, [b]Statistics Canada, and [c]U.S. Census Bureau

Appendix F Multivariate Regression Analysis Relationships between Sectors of Environmental Concern

Independent Sector		Dependent Sector						
		WQ	CHEM	WL	WA	ENVG	WAST	RAD
	AQ	(0.443)* *0.000* 0.651	(0.155)* *0.007* 0.519			(0.311)* *0.000* 1.443		
	WQ	■			(0.220)*** *0.001* 0.217	(0.274)*** *0.000* 1.192		
	PEST					(0.236)* *0.001* 1.849	(0.197)* *0.002* 0.002	(0.090)* *0.041* -0.502
	CHEM		■	(0.463)* *0.000* 0.913	(0.274)* *0.001* 0.404	(0.171)* *0.005* 0.849		
	WL			■		(0.198)* *0.002* 0.440		
	WA			(0.352)* *0.000* 0.083	■	(0.153)*** *0.008* 0.373		
	WAST			(0.223)*** *0.001* 0.409			■	
	ENER					(0.164)*** *0.006* 0.167		
	RDO			(0.419)* *0.000* 0.606	(0.212)* *0.001* 0.164			
	BIOD			(0.395)* *0.000* 0.504				
	ENVI				(0.289)*** *0.000* 0.434			
	CC			(0.434)* *0.000* 0.432		(0.159)* *0.007* 0.355		
	OZ						(0.219)*** *0.001* 0.858	

		Dependent Sector						
		ENER	RDO	SUS	BIOD	ENVI	CC	OZ
Independent Sector	AQ							
	WQ			(0.242)*** 0.001 0.170				
	PEST							
	CHEM		(0.194)* 0.002 0.210		(0.283)* 0.000 0.146		(0.462)* 0.000 -0.164	
	WL				(0.296)*** 0.000 0.137			
	WA				(0.254)** 0.000 0.080		(0.459)* 0.000 -0.050	
	WAST					(0.127)*** 0.015 0.522		(0.160)*** 0.006 0.162
	ENER	■					(0.506)* 0.000 0.130	
	RDO		■					
	BIOD			(0.212)* 0.001 0.073	■			
	ENVI					■		
	CC	(0.110)* 0.024 0.681	(0.174)* 0.004 0.024	(0.271)* 0.000 0.151			■	
	OZ					(0.109)*** 0.025 1.047		■

Note: Each cell contains the adjusted R^2 values in brackets, the prob (F) value in italics, and the slope coefficient. Sectors that did not have any significant relationships were omitted.

*denotes first order regressions using time

**denotes second order regressions using time^2

***denotes third order regressions using time^3

Appendix G Sector Regression Equations Using Standardized Sectors of Environmental Concern

Equation 1:

$$Y_{WQ} = -6.221 + 0.003\, X_t + 0.651\, X_{AQ}$$

n = 50	SE =	1.813	0.001	0.125
Adj R^2 = 0.443	prob (t) =	0.001	0.001	0.000

prob (F) = 3.98E-07

Y_{WQ}= % of Water Articles
X_{AQ}= % of Air Quality Articles
X_t= Year

Equation 2:

$$Y_{ENVG} = -3.362 + 0.002\, X_t + 1.44\, X_{AQ}$$

n = 50	SE =	1.058	0.001	0.407
Adj R^2 = 0.311	prob (t) =	0.003	0.002	0.001

prob (F) = 5.966E-05

Y_{ENVG}= % Environment in General Articles
X_{AQ}= % of Air Quality Articles
X_t= Year

Equation 3:

$$Y_{WL} = -2.626 + 0.001\, X_t + 0.913\, X_{CHEM}$$

n = 50	SE =	0.876	0.000	0.330
Adj R^2 = 0.441	prob (t) =	0.004	0.004	0.008

prob (F) = 4.45E-07

Y_{WL}= % of Wildlife-Species Articles
X_{CHEM}= % of Chemical Contaminant-Other Articles
X_t= Year

Equation 4:

$$Y_{CC} = -4.462 + 0.002\,X_t + -0.164\,X_{CHEM}$$

n = 50	SE =	0.785	0.000	0.296
Adj R^2 = 0.462	prob (t) =	0.000	0.000	0.582

prob (F) = 1.80E-07

Y_{CC}= % of Climate Change Articles
X_{CHEM}= % of Chemical Contaminant-Other Articles
X_t= Year

Equation 5:

$$Y_{WL} = -3.858 + 0.002\,X_t + 0.083\,X_{WA}$$

n = 50	SE =	0.873	0.000	0.204
Adj R^2 = 0.352	prob (t) =	0.000	0.000	0.687

prob (F) = 1.41E-05

Y_{WL}= % of Wildlife-Species Articles
X_{WA}= % of Wilderness Area Articles
X_t= Year

Equation 6:

$$Y_{CC} = -4.311 + 0.002\,X_t + -0.050\,X_{WA}$$

n = 50	SE =	0.729	0.000	0.170
Adj R^2 = 0.459	prob (t) =	0.000	0.000	0.772

prob (F) = 2.01E-07

Y_{CC}= % of Climate Change Articles
X_{WA}= % of Wilderness Area Articles
X_t= Year

Equation 7:

$$Y_{CC} = -3.875 + 0.002\,X_t + 0.130\,X_{ENER}$$

n = 50	SE =	0.634	0.000	0.061
Adj R^2 = 0.506	prob (t) =	0.000	0.000	0.038

prob (F) = 2.37E-08

Y_{CC}= % of Climate Change Articles
X_{ENER}= % of Resource Depletion-Energy Articles
X_t= Year

Equation 8:

$$Y_{WL} = -3.162 + 0.002\,X_t + 0.606\,X_{RDO}$$

n = 50	SE =	0.814	0.000	0.255
Adj R^2 = 0.419	prob (t) =	0.000	0.000	0.022

prob (F) = 1.08E-06

Y_{WL}= % of Wildlife-Species Articles
X_{WRO}= % of Resource Depletion-Other Articles
X_t= Year

Equation 9:

$$Y_{WL} = -3.175 + 0.002\,X_t + 0.504\,X_{BIOD}$$

n = 50	SE =	0.871	0.000	0.269
Adj R^2 = 0.395	prob (t) =	0.001	0.001	0.067

prob (F) = 2.82E-06

Y_{WL}= % of Wildlife-Species Articles
X_{BIOD}= % of Biodiversity Articles
X_t= Year

Equation 10:

$$Y_{WL} = -2.205 + 0.001 X_t + 0.432 X_{CC}$$

$n = 50$ $SE = 0.994$ 0.001 0.163

$Adj\ R^2 = 0.434$ $prob\ (t) = 0.031$ 0.027 0.011

$prob\ (F) = 5.80E\text{-}07$

Y_{WL} = % of Wildlife-Species Articles
X_{CC} = % of Climate Change Articles
X_t = Year

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