Amplifying Public Opinion: The Policy Impact of the U.S. Environmental Movement

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Time-series data from 1960-1998 is used to test hypotheses regarding the impact of protest and public opinion on the passage of U.S. environmental legislation. An amplification model of policy impact is introduced which posits that protest affects legislative action independent of public opinion as suggested by protest event theorists, whereas the impact of public opinion on legislative action is greater depending on the level of protest. Evidence is found for the existence of an amplification mechanism between environmental movement protest and public opinion, where public opinion affects policy above and beyond its independent effect when protest raises the salience of the issue to legislators. These findings point to the need to restructure analyses of the impact of social movements on public policy.

Introduction

In analyzing public opinion data regarding environmental concerns through 1971, Hazel Erskine (1972:120) proclaimed, "A miracle of public opinion has been the unprecedented speed and urgency with which ecological issues have burst into American consciousness." Coming into existence around 1960 along with a number of other movements for social and political change, the U.S. environmental movement has arguably been one of the most successful social movements of the 20th century – effecting mass cultural and political change. Rooted in the progressive conservation and preservationist movements of the late 19th century, the modern environmental movement is characterized by a greater diversity of tactics and a more expansive constituency than its progenitors. Rather than remain committed to the more conventional and elitist tactics of its predecessors (e.g., technical negotiations and corporate sponsors), the modern environmental movement has employed lobbying, litigation, mass media and civil disobedience to make its voice heard (Schnaiberg 1980).

While the environmental movement has undoubtedly contributed to cultural and lifestyle changes (Lounsbury 1997), the focus of this paper is to better understand the impact the movement has had on the passage of federal legislation favorable to the environment over time. Social movement scholars have been increasingly interested in outcomes after initially focusing their collective efforts on processes

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of emergence and development (Isaac and Christiansen 2002; Jenkins and Eckert 1986; Jenkins et al. 2003; McAdam [1982] 1999). Social movements can be conceptualized as seeking to gain collective benefits for a group vis-à-vis the government (Amenta and Young 1999), so it should come as no surprise that research on movement outcomes overwhelmingly examines the impact of movements on public policy (Andrews 2001; Amenta et al. 1994; McCammon et al. 2001; Piven and Cloward 1977; Rucht 1999; Soule et al. 1999). At the forefront of this burgeoning research area are quantitative analyses exploring how social movement activity and public opinion together affect the passage of public policy in the United States (Burstein and Freudenburg 1979; Burstein 1985; Costain 1992; McAdam and Su 2002; Santoro 2002; Soule and Olzak 2004).

Building on prior policy outcomes research, I introduce an *amplification model of policy impact*, positing that protest will affect legislative action independent of public opinion, and that the impact of public opinion on legislative action is greater depending on the level of protest. By focusing on the U.S environmental movement and utilizing data spanning the second half of the 20th century, this analysis increases our understanding of how social movements interact with public opinion and the democratic political system to affect changes in public policy over time at the federal level.

Social Movements and Public Policy

Studies examining the political impact of social movements can be partitioned into those predominantly focusing on protest, public opinion or both. Some scholars theorize that social movements directly affect public policy, others point to public opinion as the key to legislative action, and more emphasize the importance of examining both when analyzing the impact of social movements on public policy. After reviewing past work in these three research traditions and generating testable hypotheses from each, I consider the need for an *amplification model of policy impact* and test for the presence of an amplification mechanism between social movement activity and public opinion.

Dramatic Events: Social Movement Protest

Examinations of the public policy impact of social movements have predominantly focused on protest efficacy. Work within this theoretical approach asserts that dramatic events such as protests, rallies and sit-ins directly affect policy changes by leveraging elite concessions (Barkan 1984; Morris 1993). Two foundational works are Gamson's (1975) survey of challenging groups and Piven and Cloward's (1977) examination of poor people's movements. While not specifically focusing on policy gains, Gamson found greater rates of success among groups utilizing violent rather than more moderate tactics. However, Goldstone's (1980) reanalysis of Gamson's data found movement success was independent of tactics. Piven and Cloward emphatically supported the role of dramatic events, stating that the only power excluded groups have is disruption, which is lost when they attempt to bargain within the political system from which they have been excluded.

Case studies of the civil rights movement seem to offer the most compelling evidence of the impact that dramatic events can have on public policy. For example, the indiscriminant violence administered by Commissioner of Public Safety "Bull" Connor during the Birmingham campaign of 1963 led to embarrassing international media coverage of these events. McAdam ([1982]1999:178) notes that the federal government was forced to come to the movement's defense: "The ultimate result of this shifting posture was administration sponsorship of a civil rights bill…Under pressure by insurgents, the bill was ultimately signed into law a year later as the Civil Rights Act of 1964." Morris' (1984:287-88) account of the civil rights movement corroborates this view, suggesting that mass insurgency by Southern blacks was key to the passage of the 1964 Civil Rights Act and 1965 Voting Rights Act. These legislative victories led Morris to conclude that, "nontraditional politics was a viable method of social change, capable of bringing about the desired results far faster than traditional methods."

More recent work on policy outcomes has emphasized the importance of protest accompanied by social movement advocacy and a favorable political context. Andrews' (2001) work on the 1960s' Mississippi civil rights movement suggests that collective action, such as protest, is insufficient to garner favorable changes in public policy. Consistent with his movement infrastructure model – and in direct opposition to the claims made by Piven and Cloward (1977) – Andrews (2001) considers movements to have the greatest policy impact when they create leverage using "both 'outsider' and 'insider' tactics." Finally, recognizing the importance of collective action and strong organizations, Amenta et al. (1994) emphasize that this must occur, "in the context of favorable political circumstances." Thus, recent studies confirm the importance of collective action in achieving favorable public policy, at the same time elucidating contributing factors that need to be accounted for in the analysis below.

> Hypothesis 1: *An increase in the number of protests is positively related to the passage of favorable policy in a given year.*

Public Opinion & the Democratic Process

While many social movement researchers emphasize the importance of protest in influencing public policy, others consider these theoretical models incomplete. Burstein (1998, 1999; Burstein and Linton 2002), the most influential critic, argues that scholars examining the effect of social movements on public policy do not take public opinion into account in their modeling, a factor he claims would reduce the apparent effect of protest. Underlying Burstein's claims is a substantial amount of work on *democratic theory*, sometimes referred to as the *theory of democratic representation* (Page and Shapiro 1983; Wlezien 1995, 2004; see review in Jacobs and Shapiro 1994). This theory of policy enactment is predicated on a simple sequence of events: "Public sentiment shifts. Political actors sense the shift. And then they alter their policy behavior at the margin." (Stimson et al. 1995:543) While Stimson et al. (1995:557) find the party composition of Congress and the President to be "unquestionably important for policymaking," the basic idea is

that legislators pay attention to, and vote consistent with, the policy wishes of the public. Why? Politicians are almost always concerned with reelection, and ignoring the demands of a majority of their constituency will jeopardize their reelection chances – what Stimson et al. refer to as "rational anticipation."

While Stimson et al. considered policy responsiveness in the aggregate, other democratic theorists have focused on specific policy arenas. For example, Wlezien (1995) analyzed public preferences for U.S. governmental spending from 1973-1991. The results point to the "public as a thermostat," whereby the public continually adjusts issue area spending preferences relative to the current level of legislative action. Page and Shapiro (1983) examined the relationship between policy and preferences in the United States from 1935-1979. Page and Shapiro find that 43 percent of the 357 total cases, and 66 percent of the cases with any change, exhibited congruence between opinion and policy over a one-ear lag – showing modest support for democratic theory. In sum, public opinion is seen as the key factor determining changes in public policy in democratic theory.

> Hypothesis 2: *An increase in supportive public opinion on an issue is positively related to the passage of favorable policy in a given year.*

Mixed Models: Protest and Public Opinion

Only a handful of research has examined protest and public opinion together in order to predict shifts in public policy. Such work has primarily focused on two cases: the Vietnam War and civil rights/equal employment opportunity. Burstein and Freudenburg's (1978) groundbreaking examination of "dovish" Senate votes on Vietnam policy from 1964-1973 is the earliest assessment of the impact of protest and public opinion on congressional action. Burstein and Freudenburg find that the effects of anti-war protest and public opinion varied in both direction and strength over time. In their updated analysis of the same case, McAdam and Su (2002) find varying support for mixed models in general, with public opinion positively affecting congressional role call votes in roughly half of the specified models and only violent protests having a positive impact in comparison to nonviolent collective action.

In his assessment of the impact of public opinion and civil rights activity on the enactment of equal employment opportunity (EEO) legislation from 1940 through 1972, Burstein (1985) finds that Congress enacted EEO legislation more in response to growing public favor than to protest. Building on Burstein's claims that public opinion is the main determinant of EEO legislative enactment, Santoro (2002) examines a more temporally driven model, finding dramatic events to be most important in explaining the legislative breakthroughs up to the 1964 Civil Rights Act, whereas public opinion matters most in explaining legislation up to the 1972 additions to EEO policies.

Finally, while not directly exploring the impact of protest on policy, Soule and Olzak (2004) find that social movement organizations and favorable public opinion both significantly contributed to state level ratification of the Equal Rights Amendment from 1972-82. Thus, despite Burstein's (1998:44) expectation that

studies finding a substantial relationship between the activity of social movement organizations and policy "would often be reduced, or even eliminated, if public opinion were taken into account," the jury is still out as to whether public opinion is the more important factor when seeking to explain the passage of congressional legislation.

> Hypothesis 3: *An increase in supportive public opinion on an issue will have a greater positive effect on the passage of favorable policy in a given year than will increases in protest activity.*

Amplification Model

Past work on democratic theory points to the importance of shifting public opinion in determining policy decisions and the need to correctly specify studies of policy change to properly gauge the impact of social movements. Studies employing mixed models are a step in the right direction, yet fall short by only interpreting the effects of protest and public opinion "net of" each other. However, neither protest nor public opinion exists in a political vacuum. It is therefore necessary to model the legislative impact of each appropriately. It is reasonable to assume that, alongside other explanatory factors, the interaction of protest and public opinion induces changes in public policy. This supposition is tenable, as some social movement scholars believe protest to be an increasingly accepted form of political expression. Specifically, Meyer and Tarrow (1997; Tarrow 1998) believe that we are moving toward a "social movement society" in which protests and demonstrations have become an accepted part of the mainstream political repertoire, an argument that Goldstone (2004) extends to the global interrelations between protest and mainstream democratic processes, emphasizing that protest increases with the spread of democracy.

In order to better understand how social movement activity and public opinion jointly affect public policy, I propose an *amplification model of policy impact*. From this perspective, protest affects legislative action independent of public opinion as suggested by dramatic event theorists, whereas the impact of public opinion on legislative action depends on the level of protest. In other words, changes in public opinion have a greater impact on public policy when amplified by protest. I posit an interaction effect between social movement activity and public opinion: protest amplifies the effect of public opinion on policy gains by raising an issue's salience for legislators. Without protest, public opinion is less likely to impact policy outcomes.

> Hypothesis 4: *The effect of public opinion on an issue is amplified when accompanied by an increase in the number of protests, which is positively related to increases in the passage of favorable policy in a given year.*

Existing work has examined interactions between social movement activity and public opinion; however, these accounts improperly model the data. Burstein

(1985:86-90) finds a positive and significant interaction, concluding that civil rights demonstrations "sensitize Congress to public opinion." However, Burstein's conclusion privileges the role of public opinion and relies on models with public opinion, demonstrations and the interaction term as the only independent variables. Giugni (2004) similarly examines what he refers to as the "joint-effect" of demonstrations and public opinion on governmental spending across the United States, Italy and Switzerland, failing to find support for various interaction effects. Yet, as recent work by dramatic event theorists suggests, a properly specified model requires public opinion and protest to be considered alongside the current political context (Amenta et al. 1994; Andrews 2001). As such, the amplification model points to the importance of controlling for the current political climate when testing for the existence of an amplification mechanism between social movement protest activity and public opinion.

Research Design and Measurement

To test the hypotheses regarding the effect of environmental movement activity and public opinion on federal environmental legislation, I compiled time series data from 1960 through 1998. Although an environmentally-oriented movement can be traced back to the conservation movement of the late 19th century, scholars generally agree that the modern environmental movement emerged in the early 1960s (Brulle 2000; Costain and Lester 1998; Dunlap and Mertig 1992; Hays 1987). Focusing on the period from 1960-1998 allows examination of the entire modern environmental movement.

Dependent Variable

U.S. Environmental Laws

Past work on the impact of social movements on federal legislation has analyzed the percentage of laws passed each year (Costain 1992), monthly counts of Congressional roll call votes (McAdam and Su 2002), quarterly counts of Congressional roll call votes and Congressional hearings (Soule et al. 1999) or a constructed scale comprised of bills passed by Congress, Congressional statutes and executive orders each year (Santoro 2002). Deciding what constitutes environmental public policy is especially difficult due to the fundamental nature of environmental problems and the breadth of environmental issues (Kraft 2004). Beginning around 1960, environmental policy has primarily focused on regulating, protecting and improving environmental quality, goals that contemporaneously materialized within the modern environmental movement (Andrews 1999; Kraft and Vig 2000).

The dependent variable is operationalized as the annual count of federal laws passed by Congress favorable to the goals of the environmental movement. Measuring passage of pro-environmental policies in this manner gives an actual sense of the amount of the political agenda that addresses environmental concerns.[1] One limitation of this approach is that it ignores qualitative differences between major environmental bills and token legislation, thereby treating all bills as equal in impact. Bearing in mind that the passage of major environmental

laws is infrequent and that legislative change is incremental, as work on "policy streams" and "punctuated equilibria" suggests, even token environmental legislation is important (Baumgartner and Jones 1993; Kingdon 1984). Restricting the analysis to environmental laws considered to be of major importance would leave out a sizeable amount of legislative activity. Therefore, rather than restrict the analysis to such a limited segment of legislative action, this research examines all environmental laws.[2]

This measure was constructed using the U.S. Public Laws data file of the Policy Agendas Project conducted by The Center for American Politics and Public Policy at the University of Washington.[3] All major topic headings and subheadings were examined to determine whether laws covered under that heading were consistent with the goals of the environmental movement – specifically, whether legislation aims to regulate, protect or improve environmental quality. After determining major topic codes, textual summaries of laws passed from 1960-1998 were reviewed to cross-check Baumgartner and Jones' coding, and determine if the laws correspond with the goals of the environmental movement. The two major topics included in the analysis are *Environment* and *Energy*, with several subtopics and laws eliminated from the data set.[4] A total of 393 laws (maximum yearly count of 32 and mean of 10) with direct relevance to the environmental movement were identified over the 39-year period.[5]

Independent Variables

Environmental Movement Protest Activity

Protest is operationalized as the lagged yearly count of environmental movement protest events reported in the *New York Times Annual Index* (*New York Times* 1959-97).[6] Only non-institutional actions, such as public demonstrations and marches, sit-ins, rallies and boycotts are included in the protest event data series.

Previous studies have utilized *New York Times* protest event data in regression analyses as both independent and dependent variables (Burstein and Freudenburg 1978; Burstein 1985; Jenkins and Perrow 1977; Jenkins and Eckert 1986; Jenkins et al. 2003; McAdam [1982]1999; McAdam and Su 2002; Minkoff 1997; Santoro 2002). There are, however, several methodological criticisms levied against using the *New York Times* as a source for protest event data (for review, see Earl et al. 2004). Newspapers are biased toward covering large, controversial and violent protests and issue-attention cycles contribute to coverage decisions, tending to accentuate the peaks and valleys of protest event counts (McCarthy et al. 1996; Oliver and Myers 1999). McAdam ([1982]1999) assumes coverage bias is stable across time, thus should not affect the representability of the data in statistical analysis. Furthermore, as Jenkins et al. (2003:12) point out, "coding a single newspaper increases the likelihood that any selectiveness in reporting is consistent over time." Olzak (1989) notes several advantages of event data, one being that hypotheses and models can be compared on their "relative merits." On the other hand, Olzak also questions employing the *New York Times* as a nationally representative source. Myers and Caniglia (2004) substantiate Olzak's claim, finding the likelihood of the *New York Times* covering the late 1960s national riots is dependent upon event severity and proximity to New York City.

However, Jenkins and Perrow (1977:253) compared the national coverage of the *New York Times*, *Chicago Tribune* and *Los Angeles Times* concluding that, "the *New York Times* is basically a more complete version of the same 'news.' " Protest is lagged one year to take into account the time necessary for politicians to perceive such activities and act accordingly (Meyer and Minkoff 2004).

Measuring Public Opinion

Public opinion is measured using polling data that taps attitudes towards the environment. Since 1973, the General Social Survey (GSS) has asked respondents whether the U.S. government spends "too little" or "too much" on improving and protecting the environment.[7] Data on environmental attitudes can be extended by including data from the Roper Center for Public Opinion, which asked the identical question in 1971 (Guber 2003). Collectively, the two series yield 36 observations from 1971 through 2000.

Unfortunately, environmental public opinion data are infrequent prior to 1970, making it difficult to find measures comparable to the GSS series (Dunlap and Scarce 1991; Erskine 1972; Gilroy and Shapiro 1986). One reason for a lack of public opinion data, as Burstein (2006) notes, is that polling firms only ask about important or salient issues – a form of sampling bias. Accordingly, environmental survey questions were largely absent prior to the watershed environmental legislation establishing the Environmental Protection Agency in 1970. To analyze the impact of public opinion over the entire time series for which protest and policy data are available, I created an index of environmental attitudes combining the GSS and Roper data with 18 environmental questions relating to pollution and federal spending identified prior to 1970 – the earliest from 1954.[8] Combining the 28 readings of public opinion prior to 1971 with the GSS series and Roper Center data yields a total of 20 questions with 64 annual readings over a 46-year period.

Stimson's ([1991]1999) WCALC algorithm was employed to tabulate an environmental attitudes index covering the entire time period.[9] The WCALC program combines the results of various survey questions and extracts common components, assuming questions relate to an identifiable latent dimension (e.g., support for environmental protection). Several scholars have used this technique to construct time series public opinion data on various policy issues (e.g., Chanley 1999; Kellstedt 2003; Smith 2000). Consistent with Stimson ([1991]1999), liberal responses are defined as those calling for more action on the part of the government. The liberal responses from 64 readings of public opinion were entered into the algorithm, resulting in a series representing environmental attitudes from 1954 through 2000. The final environmental index correlates with the GSS spending measure at 0.708. Public opinion is lagged one year in order to maintain proper causal ordering, particularly the temporal aspect of the legislative process (Mackuen et al. 2002; Stimson et al. 1995; Wlezien 2004).

The dependent and independent variables are plotted together in Figure 1. The annual number of environmental laws passed successively peaks in 1970 at 18 and in 1972 at 19. Major environmental legislation was passed in both years – the Clean Air Act in 1970 and the Clean Water Act and Federal Environmental Pesticides Control Act in 1972. The annual number of environmental laws

approved by Congress percolates until peaking again at 30 in 1980, highlighted by the passage of the Comprehensive Environmental Response, Compensation, and Liability Act in the wake of the Three Mile Island nuclear accident the prior year. After declining steadily during the mid 1980s, the number of laws passed reaches its highpoint in 1988 at 33, with Congress largely focused on reducing

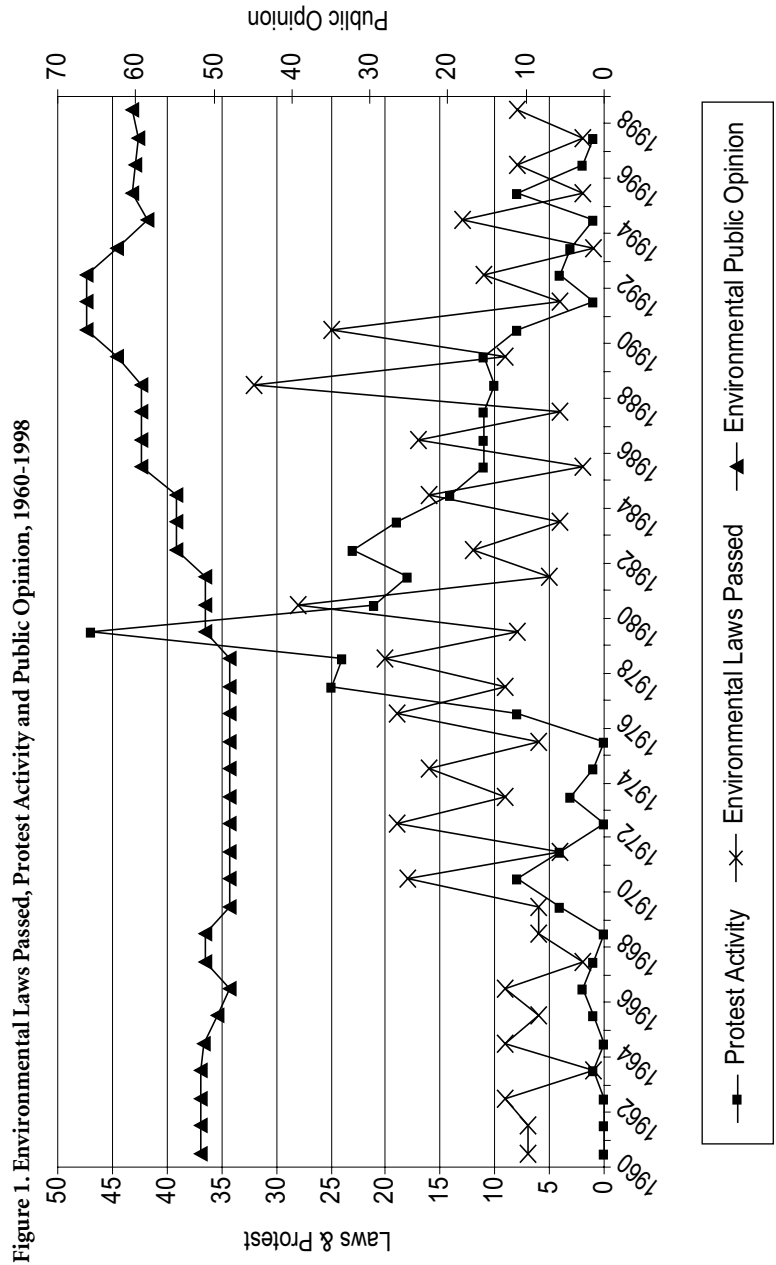

Figure 1. Environmental Laws Passed, Protest Activity and Public Opinion, 1960-1998

water pollution (the Ocean Dumping Act). Following this peak in 1988, the annual number of environmental laws passed slowly declined throughout the 1990s.

Environmental movement protest was relatively infrequent until 1970, when eight protest events were recorded in conjunction with the first Earth Day. Seven of these events focused on air pollution, the largest involving 2000 people protesting against automobile pollution in front of General Motors' New York City offices. Environmental protest dramatically increased in 1977, peaking in 1979 with 47 – many in response to the nuclear accident at Three Mile Island. Several of these were noteworthy: 30,000 people marching in San Francisco to support shutting down the Diablo Canyon nuclear power plant on April 8; 65,000 people protesting nuclear power in Washington, D.C. on May 7; and the UAW sponsored work stoppage of 1 million workers to protest the government's handling of U.S. energy problems on August 22.

Support for environmental protection fluctuated between 48.5 and 51.6 from 1960 through the end of the decade before reaching and maintaining its low point of 48.04 for most of the 1970s, then gradually climbed throughout the 1980s to a high of 66.3 in 1989. Support for environmental protection was stagnant from the early 1960s through the late 1970s while environmental movement protest activity increased, peaking when public opinion approached its lowest point during the 36-year period. Lastly, the annual number of laws passed favorable to the environmental movement steadily increased during the 1970s and early 1980s while environmental movement protest activity increased.

Control Variables

I control for several aspects of democratic politics in the United States. Democratic and political opportunity theories suggest that partisan politics and elections matter in determining public policy, social movement development and social movement outcomes (Jenkins and Perrow 1977; Jenkins et al. 2003; Jenkins and Form 2003; McAdam [1982] 1999; McLaughlin and Khawaja 2000; Meyer and Minkoff 2004; Minkoff 1997; Soule et al. 1999; Stimson et al. 1995; Wlezien 2004).

Democratic Party Dominance

The Democratic Party has been far more favorable to environmental concerns than Republicans (Englebert 1961; Kamieniecki 1995), and the gap has grown over the past 20 years (Dunlap et al. 2001; Shipan and Lowry 2001). From 1948-1998, approximately 80 percent of enacted environmental bills were introduced by Democrats. Consequently, the expectation is that more federal environmental laws will be passed when the Democratic Party controls the House, Senate and Presidency. Democratic power is an annual cumulative scale constructed from several issues of the *Statistical Abstract of the United States* (U.S. Bureau of the Census 1960-2000). It ranges from 0 to 3, with 1 "point" given if a Democratic president is in office and for each branch of Congress controlled by Democrats.

Electoral Cycles

Given the importance of elections to politicians (Arnold 1990; Jacobs and Shapiro 2000), and the electorate's heightened focus on legislative matters during election years, political parties try to favorably represent themselves and their

members by pushing through important legislation during election years. Jacobs and Shapiro (2000) discuss the importance of elections in directing legislators' attention toward public opinion, noting that pressure to satisfy public pressure subsides after election day. This rational anticipation by elected officials is necessary to better represent themselves to their constituents and increase their reelection prospects (Stimson et al. 1995). Therefore, I expect an increase in the passage of federal environmental policy during an election year, which are coded 1 (Meyer and Minkoff 2004; Soule et al. 1999).

Environmental Advocacy

As Andrews (2001) notes, advocacy is a key aspect of social movement activity, as movements simultaneously employing insider and outsider tactics have the greatest policy impact. Consistent with past work, advocacy by a group or organization is defined as "the pursuit of a collective good framed in the public interest." (Andrews and Edwards 2004:485; Jenkins 1987) Environmental advocacy is operationalized as the annual count of non-protest related environmental movement events as reported in the *New York Times Annual Index* (*New York Times* 1959-97), and includes actions such as lobbying efforts, petitions, voter registration campaigns and court cases. A similar measure of social movement advocacy was used by Soule et al. (1999) in their examination of the impact of the U.S. women's movement on Congressional activities. Environmental scholars have noted that advocacy has been the predominant tactic for the environmental movement (Schnaiberg 1980). As with protest and public opinion, environmental advocacy is lagged one year to maintain proper causal ordering.

Media Attention

Whether contributing to protest efficacy (Lipsky 1968), shaping perceptions of protestors (Gitlin 1981), or helping to guide public opinion towards policy (Iyengar and Shanto 1987; Page et al. 1987), there is general agreement that mass media affects the policy process. For example, Zaller (1992) illustrates how priming by mass media can raise the salience of a topic, causing noticeable shifts in related attitudes. Particularly relevant to the environmental case is Downs' (1972) "issue attention cycle," highlighting the importance of mass media in focusing public attention to particular issues. Downs presciently considered environmental concern to be of future interest among the public despite what his issue attention cycle would predict. Downs' insight was corroborated by Guber (2003), who found a constant yet fluctuating level of environmental support, owing partly to the level of media attention in a given year. Media attention is measured using the annual number of stories in the *New York Times Annual Index* referring to the environment. The data, derived from sampling the first entry on every odd-numbered page of the index, come from The Policy Agendas Project.

Environmental Laws Lagged

The number of environmental laws passed in the prior year is controlled, as current legislation is often contingent on previous legislation. This variable is identical to the dependent variable in the analysis, except that it is lagged one

Table 1: Descriptive Statistics

	Mean	Standard Deviation	Minimum	Maximum	N
Environmental Laws Passed	10.08	7.58	1	32	39
Environmental Movement Protest $_{(t-1)}$	7.85	9.98	0	47	39
Public Opinion $_{(t-1)}$	54.24	5.98	48.04	66.26	39
Environmental Movement Advocacy $_{(t-1)}$	16.49	15.84	0	72	39
Election Year	.51	.51	0	1	39
Democratic Scale	2.10	.79	1	3	39
Media Attention	13.23	8.33	1	46	39
Interaction: Protest and Public Opinion $_{(t-1)}$	427.44	520.90	0	2400.85	39
Environmental Laws Passed $_{(t-1)}$	10.05	7.58	1	32	39

Note: Statistics from 1960-1998.

year. Descriptive statistics for the dependent and independent variables are shown in Table 1. Bivariate Pearson correlations are shown in the appendix in Table A1.

Methods

Poisson regression is the preferred statistical inference technique when fitting models with count data as the dependent variable (Long 1997). However, negative binomial regression is often necessary when the assumptions of the Poisson distribution are violated. The Poisson distribution has a rather restrictive assumption, that the mean equals the variance (i.e., *equidispersion*). If the mean and variance of the dependent variable are not equidispersed the standard errors will be downwardly biased, although the coefficients remain unaffected (Hoffmann 2003). The density of laws per year (not shown) approximates the Poisson distribution rather well – with larger counts toward zero and a positive skew. Because the annual count of environmental laws appear overdispersed, with mean 10.3 and variance 61.6, I began by fitting negative binomial models which provide a formal statistical test for the presence of overdispersion in the data. The likelihood ratio test of the dispersion parameter alpha was not significantly different from zero, which suggests the Poisson distribution may be a more appropriate fit for the data. The data identified above are utilized to test relevant hypotheses using Poisson regression analysis.

Results

The results from multivariate Poisson regression models of the determinants of federal environmental laws from 1960-1998 are shown in Table 2.[10]

Model 1 empirically tests the first hypothesis based on the dramatic events model: that protest will be positively related to the passage of pro-environmental policies. Hypothesis 1 is supported as protest is found to be positively and significantly related to the passage of laws, controlling for other political factors.

Table 2: Effects of Environmental Movement Protest Activity and Public Opinion on Federal Environmental Legislation

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	.848**	.448	.679*	.497	.418
	(.283)	(.294)	(.300)	(.304)	(.371)
Environmental Movement Protest $_{(t-1)}$	.012**		.012**	.027***	.043***
	(.004)		(.004)	(.007)	(.012)
Public Opinion $_{(t-1)}$		.021*	0.019[a]	.029**	.007
		(.010)	(.011)	(.011)	(.014)
Interaction: Protest and Public Opinion $_{(t-1)}$				.005**	.005**
				(.002)	(.002)
Environmental Movement Advocacy $_{(t-1)}$	.007*	.013***	.011**	.012**	.008
	(.004)	(.004)	(.004)	(.004)	(.006)
Election Year	1.343***	1.464***	1.314***	1.261***	1.601***
	(.202)	(.196)	(.204)	(.204)	(.291)
Democratic Scale	.060	0.143[a]	0.12[a]	.230**	.227*
	(.069)	(.079)	(.077)	(.086)	(.094)
Media Attention	.011*	.012*	.014*	.015*	.011
	(.006)	(.006)	(.006)	(.006)	(.015)
Environmental Laws Passed $_{(t-1)}$	.017	.023[a]	.013	.005	.022
	(.014)	(.013)	(.014)	(.014)	(.018)
Log Likelihood	-104.55	-106.39	-102.98	-97.62	-64.38
Pseudo R^2	.410	.399	.419	.449	.514
Compared to Model 3				10.72***	
N	39	39	39	39	27

Note: Statistics from 1960-1998.
Standard errors are in parentheses. Protest and Public Opinion are mean centered.
Model 5, comparable to Model 4, examines the 1972-1998 GSS public opinion series.
[a] $p \leq .10$ * $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Based on the results of Model 1, dramatic event theorists are correct to posit a direct relationship between protest and changes in public policy. Exponentiating the beta coefficients allows for decomposing the expected change in the dependent variable per each unit change in the independent variable, net of the other variables in the model. Accordingly, each protest event in a given year, net of the control variables, increases the likelihood of pro-environmental legislation being passed by 1.2 percent ($e^{.012}$). Given the mean level across the time series, protest is on average associated with a 9.5 percent increase in the annual expected number of pro-environmental laws passed. These results are consistent with past work utilizing a dramatic events approach, and suggest that social movements can directly impact public policy when they employ dramatic events such as protests and demonstrations.

Hypothesis 2, testing the basic premise of democratic theory, anticipates supportive public opinion to influence favorable policy outcomes in a given year. Model 2 finds support for the assertion that shifts in public opinion affect changes in successful pro-environmental legislation. The effect of support for

environmental protection, net of the control variables, is positive and statistically significant. Supporting the expectations of democratic theory, public opinion on environmental issues is positively related to the annual number of federal pro-environmental laws passed. These results suggest that legislators respond to public opinion when voting on environmental legislation.

Model 3 examines the mixed-effect of protest and public opinion on environmental legislation as predicted by Hypothesis 3, which expects public opinion to have a greater positive effect on policy than protest. There was no support for this hypothesis; the impact of protest remains positive and significant even after the inclusion of public opinion. Further, the explained variance increases when protest and public opinion are included in the same model. Contrary to the expectations of Burstein and Linton (2002) the effect of protest on public policy is robust with the inclusion of public opinion.

Model 4 statistically tests the amplification model of policy impact formalized by Hypothesis 4, which predicts that the effect of public opinion on changes in public policy will be amplified when accompanied by an increase in protest. The presence of an amplification mechanism is empirically tested via an interaction term between protest and public opinion. Results from Model 4 provide strong support for the existence of an amplification mechanism, as the interaction coefficient is positive and significant and the likelihood ratio test comparing Model 4 to Model 3 is statistically significant at the .001 level, pointing to the improved model fit gained by including the interaction term. Specifically, an increase in public support for environmental protection has a positive and significant impact on the passage of laws favorable to the environment when accompanied by increases in protest – above and beyond the direct effects of each. In brief, protest raises the salience of public opinion for legislators. These results lead to an important conclusion: when both protest and public opinion are at high levels, they jointly influence policy makers in ways that would be impossible if each existed without the other. In order to examine the robustness of the results from the 1960-1998 period using the constructed public opinion index, the percentage of respondents believing that the U.S. government is spending "too little" on improving and protecting the environment is employed as the public opinion measure in a shorter series from 1972-1998 shown in Model 5. The effects of protest and public opinion are nearly identical across the two time periods, as is

Table 3: Expected Count of Laws Passed at Different Levels of Protest and Public Opinion

	Public Opinion Low	Public Opinion Avg	Public Opinion 1sd $\geqslant m$	Public Opinion 2sd $\geqslant m$
Protest Low	6	7	8	9
Protest Avg	7	8	10	11
Protest 1sd $\geqslant m$	9	11	13	15
Protest 2sd $\geqslant m$	12	14	17	20
Protest 3sd $\geqslant m$	15	18	22	26

Note: Expected Counts calculated from estimates in Table 2, Model 4. All other variables are held at their means.

the interaction of protest and public opinion.

Table 3 illustrates the interaction of environmental protest and public opinion by generating an expected count of laws by varying levels of protest and public opinion, holding all other variables at their means.[11] A greater understanding of the interaction is gained by scanning the effect of protest (and likewise public opinion) when keeping the other at its mean. When examined as such, protest has a greater variable impact on the expected number of pro-environmental laws passed than does public opinion. In sum, increases in support for environmental regulation positively and significantly impact changes in pro-environmental public policy *above and beyond its independent impact* when accompanied by protest which raises the salience of the public's interest to legislators.

Turning to the beta coefficients for control variables in Model 4, environmental movement advocacy positively impacts changes in pro-environmental public policy. It would appear that environmental advocacy is an important piece of the legislative puzzle (Andrews 2001). Of all the control variables, Congressional election years have the largest effect, which is positive and significant. The presence of a Congressional election year nearly quadruples the expected number of annual laws passed ($e^{1.261}$). The scale measuring Democratic control of the White House, Senate and House of Representatives is positive and significant in the fully specified model. The expected number of pro-environmental laws passed increases approximately 23 percent for each legislative branch under Democratic control – a nearly 70 percent increase when both houses of Congress and the White House are Democratically controlled. Media attention significantly increases the number of environmental laws passed in a given year, presumably by raising the salience of the issue among legislators and the public. The number of environmental laws passed in the prior year does not predict the passage of laws in the current year. Finally, the effects of the control variables from the shorter series (Model 5) are nearly identical to those from the full time period, although the effects of environmental advocacy and media attention fall below statistical significance.

In light of the consistently strong effect of Congressional election years, I tested for the presence of an amplification effect between election years and both protest and public opinion (Table 4). Given the prominence of elections for politicians and the electorate's heightened attention to legislative matters during election years, public officials may be more responsive to public opinion and protest during election years. Model 1 tests for an amplification effect between environmental protest and Congressional election years. The effect of protest on the passage of pro-environmental legislation is not amplified during an election year, as the interaction term in Model 1 is not significant by conventional standards. Model 2 tests for an amplification effect between public opinion and Congressional election years. The interaction term in Model 2 is positive and significant, suggesting that election years magnify the effect of public opinion on pro-environmental policy. Based on the results of tables 2 and 4, the greatest single predictor of the passage of pro-environmental laws is part of the process of rational anticipation discussed by Stimson et al. (1995) in which elected officials are almost always concerned with reelection. Further, based on

Table 4: Interaction Effects of Elections with Protest and Public Opinion on Federal Environmental Legislation

	Model 1	Model 2
Intercept	.495[a]	.350
	(.303)	(.313)
Environmental Movement Protest $_{(t-1)}$	.018	.027***
	(.016)	(.006)
Public Opinion $_{(t-1)}$	.028**	-.018
	(.011)	(.022)
Interaction: Protest and Public Opinion $_{(t-1)}$	.005**	.005**
	(.002)	(.002)
Environmental Movement Advocacy $_{(t-1)}$	.011**	.010**
	(.004)	(.004)
Election Year	1.212***	-1.637
	(.216)	(1.135)
Democratic Scale	.215**	.219**
	(.089)	(.085)
Media Attention	.014*	.015*
	(.006)	(.006)
Environmental Laws Passed $_{(t-1)}$	.009	.017
	(.015)	(.015)
Interaction: Protest$_{(t-1)}$ and Election Year	.010	
	(.016)	
Interaction: Public Opinion$_{(t-1)}$ and Election Year		.056**
		(.022)
Log Likelihood	-97.42	-94.14
Pseudo R^2	.450	.468
N	39	39

Note: Statiscs from 1960-1998.
Standard errors are in parentheses. Protest and Public Opinion are mean centered.
[a] $p \leq .10$ * $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Model 2 in Table 4, it seems that the impact of public opinion on environmental policy is heightened during an election year – amplified by the process of rational anticipation. Legislators do pass greater numbers of pro-environmental legislation during election years, which is partly due to the nature of the congressional workload and the increased awareness of an electorate seeking to make informed decisions about their elected officials, but also the generally pro-environmental sentiment amongst U.S. citizens (Guber 2003). Accordingly, the salience of environmental concerns among the electorate is enhanced by protest and election cycles, which stimulate policy action by elected officials.

Discussion and Conclusions

In this article, I introduce and find empirical support for an *amplification model of policy impact*. In short, public opinion influences changes in pro-environmental public policy above and beyond its independent impact when accompanied by protest which increases the salience of the public's demands in the eyes

of legislators. Increases in support for environmental regulation have a greater impact on the passage of environmental legislation consistent with the goals of the environmental movement depending on the level of environmental protest. Thus, a greater amount of federal legislation is passed when protest amplifies, or raises the salience of, public opinion on a given issue. Empirical support for the *amplification model of policy impact* points to the need for a modification, or re-examination, of democratic theory in order to incorporate testable hypotheses for our "social movement society." (Meyer and Tarrow 1997; Tarrow 1998) At the same time, social movement scholars need to account for public opinion on issues concerning social movements when evaluating the role of protest on policy outcomes. The amplification model of policy impact suggests work that overlooks the interplay between public opinion and social movement activity does not fully account for the determinants of public policy.

The amplification model also highlights the importance of controlling for the current political climate in modeling the relationship between social movement activity, public opinion and public policy. Consequently, results reported by Burstein (1985) and Giugni (2004) must be viewed with caution, as they fail to control for media attention and legislative context. Further, the impact of public opinion on policy is amplified by election cycles as well as protest. This finding is particularly noteworthy given that Page and Shapiro (1983) found that 55 percent of the policy arenas analyzed showed no change or an incongruent change between public opinion and policy. In light of this analysis, it is possible that the missing factor in Page and Shapiro's study is an amplification mechanism. Some policy arenas may only be responsive to public opinion when the salience of electorate concerns are heightened by protest or elections.

The generalizability of these findings, as well as the applicability of the *amplification model of policy impact* presented in this paper are open questions. While an amplification mechanism exists between protest and public opinion on pro-environmental policy, a broader analysis of different cases in the United States and abroad is warranted. One scope condition of the amplification model presented in this paper is that it only applies to legislation consistent with social movement goals. Accordingly, future research must address whether the model is equally applicable to policy conflicting with these goals. It is also important to determine whether these findings only relate to low-salience issues – although the public overwhelmingly supports strict environmental standards and regulation (Downs 1972; Erskine 1972; Guber 2003), environmental concerns are never high salience issues comparable to the economy and foreign policy. For example, a comparative examination of protest and public opinion – and the presence of possible amplification processes – over several policy arenas of varying salience would better clarify the generalizability of the model. Although these results are informative, they are also limited by exclusively focusing on the final stage of legislative activity and a lack of in-depth case studies. Future research on the impact of social movements on public policy should examine the entire legislative process, from agenda setting to bill introductions to the passage of legislation. In so doing, one possibility is to employ case study methodology to follow several bills through the legislative process to better elucidate the dynamics of protest, public opinion and legislative activity.

Notes

1. The raw legislative counts are highly correlated with the proportion of laws passed each year, suggesting both measures accurately portray the environmental portion of the legislative agenda. As additional confirmation, the results were nearly identical when employing the proportion of environmental laws passed as the dependent variable using OLS regression.

2. A common approach to weighting the importance of legislation is to take into account whether or not the bill has been discussed in Congressional Quarterly (e.g., Howell et al. 2000; Mayhew 1991). When the dependent variable is restricted to the 217 environmental laws discussed in Congressional Quarterly, available via the Public Laws data file, the empirical results are nearly identical.

3. The data used here were originally collected by Frank R. Baumgartner and Bryan D. Jones, with the support of National Science Foundation grant number SBR 9320922, and were distributed through the Center for American Politics and Public Policy at the University of Washington and/or the Department of Political Science at Pennsylvania State University. Neither NSF nor the original collectors of the data bear any responsibility for the analysis reported here. For details, see Baumgartner and Jones (2003) or the project website: http://depts.washington.edu/ampol/.

4. All laws on the *Environment* (major topic code 7) and the *Energy* subtopic codes *Alternative and Renewable Energy* (806) and *Energy Conservation* (807) were initially selected. Within this subset of 429 laws, 36 questionable cases were eliminated because they were narrow in scope or inconsistent with the movement's goals. *Public Lands and Water Management* (major topic code 21) was excluded on the grounds that these laws primarily center on resource extraction in contrast to the goals of the environmental movement.

5. A total of 12,073 laws were passed by Congress over this 39-year period, with an annual mean of 309. The smallest number of laws, 88, was passed in 1995, whereas the largest number, 503, was passed in 1970. When averaging over every issue area for each year, the average number of laws passed in a given area was 16.29. Thus, on average, a given area made up only 5 percent of the laws passed each year.

6. The event data were coded based on the scheme developed by McAdam ([1982]1999) and cover the time period from 1959 through 1997. The data were collected as part of J. Craig Jenkins' social movement event data collection project. (See Jenkins et al. 2003 for an application of civil rights movement event data from the same project.) Details on the coding scheme and code book are available from J. Craig Jenkins upon request.

7. See Dunlap and Scarce (1991: 664) for full question wording and trend results from 1973 to 1990. The remaining years of GSS (1991-1998) and Roper Center for Public Opinion (1971-1986) data are available from the iPoll database of the Roper Center for Public Opinion: http://www.ropercenter.uconn.edu/ipoll.html.

8. Available data was identified using the Roper Center for Public Opinion iPoll database, scanning all questions prior to 1970 under the *environment* heading, as well as via "The Polls" series relating to the environment in *Public Opinion Quarterly* (Dunlap and Scarce 1991; Erskine 1972; Gilroy and Shapiro 1986).

9. The WCALC program, discussed in detail in the appendix of Stimson ([1991]1999), is publicly available: http://www.unc.edu/~jstimson/. The environmental index utilized in this analysis is unadjusted to maintain yearly fluctuations in environmental attitudes.

10. Protest and public opinion are mean centered in all models. The mean centered coefficient for protest in the interaction models represents the influence of protest on law passage when public opinion is at its mean. (See Jaccard and Turrisi 2003 for a detailed discussion on centering and interpreting interactions.)

11. J. Scott Long's Xpost program for count models, available on his homepage (http://www.indiana.edu/~jslsoc/xpost.htm), was used to generate the predicted counts. Protest is observed at 0 (the lowest observed value), 7.85 (average), 17.85 (one standard deviation above the mean), 27.85 (two standard deviations above the mean) and 37.85 (three standard deviations above the mean). Public opinion is observed at 48.04 (the lowest observed value), 54.24 (average), 60.22 (one standard deviation above the mean) and 66.2 (two standard deviations above the mean).

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Appendix

Table A1: Pearson Correlation Coefficients, 1960-1998

		1	2	3	4	5	6	7	8	9
1.	Environmental Laws Passed	1.000								
2.	Environmental Movement Protest $_{(t-1)}$	.389	1.000							
3.	Public Opinion $_{(t-1)}$	-.044	.032	1.000						
4.	Environmental Movement Advocacy $_{(t-1)}$	.242	.257	-.345	1.000					
5.	Election Year	.689	.063	-.003	-.081	1.000				
6.	Democratic Scale	.052	-.112	-.373	-.093	-.003	1.000			
7.	Media Attention	.225	.082	-.215	.477	-.023	-.188	1.000		
8.	Interaction: Protest and Public Opinion $_{(t-1)}$	.388	.995	.105	.231	.058	-.153	.073	1.000	
9.	Environmental Laws Passed $_{(t-1)}$	-.345	.221	.060	.303	-.706	-.063	.260	.233	1.000

Table A2. Environmental Question Wording, Polling Organization and Number of Annual Readings, 1954-2000

Polling Firm	Years	Question Wording	Annual Readings
General Social Survey	1973-2000	(We are faced with many problems in this country, none of which can be solved easily or inexpensively. I'm going to name some of these problems, and for each one I'd like you to tell me whether you think we're spending too much money on it, too little money, or about the right amount.)... Improving and protecting the environment	24
Roper Center for Public Opinion	1971-1986	(We are faced with many problems in this country, none of which can be solved easily or inexpensively. I'm going to name some of these problems, and for each one I'd like you to tell me whether you think we're spending too much money on it, too little money, or about the right amount.)... Improving and protecting the environment	12
Opinion Research Center	1965-1970	Compared to other parts of the country, how serious, in your opinion, do you think the problem of water pollution is in this area – very serious, somewhat serious, or not serious?	5
Opinion Research Center	1965-1970	Compared to other parts of the country, how serious, in your opinion, do you think the problem of air pollution is in this area – very serious, somewhat serious, or not serious?	5
Opinion Research Center	1962-1963	(Here are cards describing different issues and problems that people are talking about. I would like to get your opinion on how important you think it is that something be done about each. Please arrange the cards into three different groups, using this board. After reading each statement – If you think there is a great and urgent need that something be done about the matter, put the card in this box, 'Great and urgent need for action.' If you think something should be done about the matter, but that it is not too urgent, put the card in this box, Need for some action, but not too urgent.' If you think that little or nothing should be done about the matter, put the card in this box, 'Little or no need for action.')... Conserving the country's natural resources.	2
Opinion Research Center	1967 & 1970	Would you be for or against spending federal government funds on research to find new ways to control pollution?	2
Opinion Research Center	1968	Would you be for or against companies being given tax reductions to help them cover the cost of installing pollution control equipment?	1
Opinion Research Center	1954	(Here are some criticisms that have been made about big business. Would you read each one of these and tell me which you agree with and which you have some doubt about?)... Does not conserve our natural resources	1

Table A2 ***(continued)***

Gallup	1955	Can you say for certain that you never throw matches, empty cigarette packs, candy wrappers, and such things, on streets, roads and other public places?	1
Gallup	1956	Some people say that the amount of waste paper and other trash thrown on streets, roadsides, in parks and other public places is a serious problem. In general, would you say this is true or not?	1
Gallup	1969	On which of the problems do you think the government should be spending more money--and on which should it be spending less money?...Air and water pollution?	1
Gallup	1969	You may have heard or read claims that our natural surroundings are being spoiled by air pollution, water pollution, soil erosion, destruction of wildlife and so forth. How concerned are you about this--deeply concerned, somewhat concerned, or not very concerned?	1
Gallup	1969	How much would you be willing to pay each year in additional taxes earmarked to improve our natural surroundings – a small amount such as $10.00 or less, a moderate amount such as $50.00, or a large amount such as $100.00 or more?	1
Harris	1965	As an American, have you often, sometimes, or hardly ever felt bad because... of the pollution of rivers and streams?	1
Harris	1966	As far as the rivers, lakes and streams around here go, do you feel that a lot of them, some but not a lot, only a few or almost none are polluted?	1
Harris	1966	How would you rate the job... federal government... has done in helping to control water pollution – excellent, pretty good, only fair, or poor?	1
Harris	1967	(Besides providing for the military security of the country, the federal government conducts a number of programs in many different areas. I want to run down some of these programs. For each, tell if you think it should be expanded, kept as is or cut back.)... Program to cut air pollution	1
Harris	1967	(Besides providing for the military security of the country, the federal government conducts a number of programs in many different areas. I want to run down some of these programs. For each, tell if you think it should be expanded, kept as is or cut back.)... Program to cut water pollution	1
Harris	1969	Thinking about air and water pollution, improvement of land and water, forests, fish and wildlife, recreation and park areas – do you think programs for improvement of the natural environment now receive too little attention and support from the government, now receive too much attention and financial support, or just about the right amount?	1
Harris	1970	(How would you rate the job each of the following has done in helping to control air pollution--excellent, pretty good, only fair, or poor?)... Federal government.	1