New Mexicans' Attitudes Toward the Environment, Agriculture and Government[1]

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INTRODUCTION

This report presents the findings of a recent project that examined New Mexican's attitudes toward the environment, agriculture and government. The project's objective was to provide information and tools to assist communities, agencies, educators, nonprofit groups and the private sector in dealing with environmental issues or conflicts.

This report describes the development and use of an attitude assessment instrument that was administered statewide in 2000-2001, and which could be applied to other groups in the future. The instrument was administered via a mail survey. The resulting data give insight into the study population's environmental attitudes, their opinions about the agricultural sector's contributions to environmental problems, and their beliefs about government's role in dealing with the environment. Analysis of variance was conducted to examine socioeconomic correlates of the respondents' attitudes, and cluster analysis was used to further summarize the attitude types identified through the survey. An additional output was a simple spreadsheet program that can be used to quickly assess attitudes in a variety of settings.

Effective environmental or natural resource policymaking, planning, regulation and management involve communication,

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teamwork and consensus building. Current environmental policies tend to consider attitudes only in the last stage of policy analysis, after science and economics have identified problems and solutions (Proops, 2001). The result can be government policy that works against public opinion rather than with it, and regulatory processes that foment public discord, suspicion and distrust. Communication between stakeholders can be extremely contentious or cease altogether. It is hoped that the results of this project can contribute to better communication and enhanced mutual respect among those involved in natural resource issues in New Mexico and elsewhere.

METHODOLOGY

The project reported on here involved several steps: comprehensive literature review of previous studies, a statewide mail survey of New Mexicans involved in community initiatives, basic data processing and analysis, development of attitudinal scale indicators and further analysis. The literature review was conducted in 2000; the mail survey was administered between July 2000 and February 2001. Data were processed and analyzed from mid-2001 into 2002. Dillman's (1978) Total Design Method was applied throughout the survey design and administration processes.

PREVIOUS STUDIES

Attempts to measure levels of environmental concern, perceptions and attitudes date back to the late 1960s. Much of the published research on environmental and agricultural attitudes is reviewed in appendix A of this report. This literature review is not exhaustive, and new literature is continuously being published. Many of these published articles were used to develop the New Mexico survey questionnaire.

THE SAMPLE

The mailing list (i.e., sampling frame) used in this study was obtained from New Mexico State University's Cooperative Extension Service. The list included names of individuals throughout New Mexico who have participated in economic development activities or forums in association with Extension and other state groups or agencies. The list consisted of a broad cross section of

state residents, including concerned citizens, business owners, government employees, elected officials and tribal representatives. The people on the list have had an interest in their communities, economic development and policies that affect the state. The mailing list contained both self-selected individuals interested in economic development and economic development professionals (Coppedge, 2001). Individuals on the mailing list primarily included those who attended meetings, seminars or conferences related to community development issues. There was no presampling stratification of individuals on the list by county, town, zip code or any other variable.

Before sampling, the list was searched for duplicate names, and a small number of duplicates were eliminated from the sampling frame. There were a total of 2,875 names on the final list. A 50% random sample was selected for the first mailing of the questionnaire. The first mailing was conducted in mid-July 2000. The mailing packet consisted of a numbered survey questionnaire, an explanatory cover letter and a postage-paid return envelope. All survey correspondence was sent via first-class mail. A reminder postcard was sent one week after the questionnaire packet. Another mailing of the complete survey packet was sent to nonrespondents in early September 2000. The questionnaire and a copy of the explanatory cover letter are presented in appendix B.

The response rate for the first half of the sample (both first and second mailings) was 42.5%. This response rate was calculated as the number of completed questionnaires divided by the total number of packets mailed out less undeliverable packets. Ninety survey questionnaire packets were returned because they were undeliverable.

The second half of the complete sampling frame (i.e., the names not selected after the first 50% sample was chosen) received a mailing of the complete survey packet in October 2000. The survey packet consisted of the same items as described above and a reminder postcard was sent one week later. A second mailing of the complete packet was sent to nonrespondents in early November 2000. The response rate (i.e., usable, completed questionnaires, divided by total number of packets mailed out, less undeliverable packets) for the second half of the complete sampling frame was 40.2%. There were 105 undeliverable packets received back at NMSU from the October-November mailings.

Completed, usable questionnaires were received at NMSU through fall 2000 and into the first six months of 2001. Data were entered into a spreadsheet program as the questionnaires were received. The data set, finalized in June 2001, contains 1,100 observations. The final usable response rate to the survey (adjusted for undeliverable mailings) is 41.4%.

A t-test procedure was applied to the finalized data set to test for differences between respondents to the July-September mailing and the October-November mailing. The t-test procedure compared mean responses to survey items between the first and second sets of respondents. This test was applied to attitudinal questions included in Parts I–IV of the questionnaire. The null hypothesis was that the two mean responses to an individual survey item do not vary, while the alternative hypothesis is that the two means are different for a survey item. Of the 86 attitudinal questions analyzed, the null hypothesis was accepted for 82 questions, and it was concluded that there were no significant response differences between the two groups for those survey items. The null hypothesis could not be accepted for four of the survey items. Given the small differences between the data subsets, both were combined into the 1,100 response final data set.

THE QUESTIONNAIRE

A questionnaire (appendix B) designed to assess attitudes toward the environment, water quality, agriculture and government was developed specifically for this project. An extensive literature review was conducted beginning in late 1999 and continuing into 2000. These earlier published materials reported on previous efforts throughout the United States (and elsewhere) to investigate public attitudes toward the environment, agriculture and other related subjects. The published materials were used to develop the current questionnaire. NMSU Agricultural Biometric Service statisticians reviewed the questionnaire as it was being developed and made numerous suggestions, which were incorporated into the final version. The NMSU Institutional Review Board approved the final questionnaire and the survey packet cover letter.

Part I of the questionnaire consisted of 16 attitudinal statements covering agriculture and water quality issues, with responses ranging from strongly disagree (scored as 1) to strongly agree (scored as 5) and including "undecided" or "don't know" (scored as 3). The Part I questions were designed to assess attitudes about agriculture's contribution to water quality and environmental problems, the New Mexico farm and ranch population, and agrarian fundamentalism.

Part II of the questionnaire included 36 attitudinal statements (with responses ranging from 1to 5) regarding government, government policies and environmental regulations. These questions were designed to identify attitudes that would create challenges for agencies charged with implementing environmental regulations in the state. Several of the questions addressed trade-offs that may exist between environmental and economic benefits, and general attitudes toward the role of government.

Part III of the survey instrument consisted of 19 attitudinal statements (again, on a strongly agree to strongly disagree scale) that addressed opinions about water quality issues and policy in New Mexico. Questions eliciting attitudes toward water quality information, public education and officials who administer environmental regulations were included.

Part IV was comprised of 15 attitudinal statements that sought to identify attitudes and beliefs that could be characterized as "environmentalist" in nature. The statements also were designed to identify respondents' beliefs about relationships between humans, other species and the natural environment. Questions about current environmental risks also were included. Many of these questions were consistent with previous studies investigating the prevalence of the New Environmental Paradigm (NEP) .

Part V of the survey instrument included six questions that asked respondents to assess the quality of groundwater and surface water in New Mexico. Respondents also were asked their opinions about the level of resources devoted to improving water quality in the state, and the status of current environmental laws or regulations (including the 1972 Clean Water Act).

Part VI of the questionnaire requested sociodemographic information from the respondents, including their political orientation, affiliation with natural resource-based industries, place of residence, sources of information about environmental issues, education, age, gender, ethnicity and household income. There were 13 questions included in Part VI.

DATA PROCESSING

Data were entered into Microsoft Excel™ as the completed questionnaires were received. The data were checked for errors and analyzed for frequencies using SAS™ (SAS Institute Inc., 1990). The data were verified and proofread before the final data set was used for analysis.

ORIGIN OF RESPONDENTS

Using the addresses (specifically the zip codes) from the mailing list, the 1,100 respondents were stratified by county and region of the state. There were five regions established to analyze the survey data: northwest, north-central, northeast, southwest, and southeast. Table 1 shows the counties included in each region. The total number of respondents accounted for here is 1,097, because three completed and returned questionnaires had their identification numbers removed.

New Mexico counties also were categorized as rural or urban. This classification scheme is presented in table 1. There were a total of 774 respondents from rural counties and 323 from urban counties. Table 2 also illustrates the heavier weighting of rural respondents to the survey. Responses as a percentage of the total adult population by county are highest for some of the most rural and least densely populated areas of the state (e.g., Catron, Harding, DeBaca and Union counties).

POTENTIAL SOURCES OF BIAS IN THE SURVEY RESULTS

The survey results and subsequent analyses are subject to several potential sources of bias, which are discussed here due to their possible impacts on the results.

One source of bias may be the origin and nature of the mailing list used. The mailing list consisted of individuals who have been involved in economic or community development efforts or forums. These people ranged from private, concerned citizens to employees of a variety of government agencies. These people may or may not tend toward progrowth, prodevelopment and anti-environmentalism attitudes. Many of them could be residents of rural or urban-fringe communities that have been impacted by growth. Negative experiences with rapid development may have prompted them to become involved in more formal community

Table 1. New Mexico counties included in analysis regions, with respondents for each county.

Region Name:	**Northwest**		**North-Central**		**Northeast**		**Southwest**		**Southeast**		**Unidentified**
Total Respondents:	103		352		103		208		331		3
Respondents as % of Total:	9.4		32.0		9.4		18.9		30.1		0.27
	County / Responses										
	Cibola	33	Bernalillo*	124	Colfax	26	Catron	10	Chaves	38	
	McKinley	20	Los Alamos*	16	Guadalupe	12	Doña Ana*	49	Curry	49	
	San Juan	50	Rio Arriba	37	Harding	6	Grant	55	De Baca	11	
	Sandoval*	36	Mora	11	Hidalgo	16	Eddy	36			
	Santa Fe*	79	San Miguel	20	Luna	25	Lea	54			
	Taos	23	Union	28	Sierra	28	Lincoln	36			
	Torrance	18	Socorro	25	Otero	34					
	Valencia*	19	Quay	48							
	Roosevelt	25									

* Indicates county also coded as "urban." Counties without * were coded as "rural."

Table 2. Adult population, survey respondents and total mailings by county.

County	Adult Population*	Adult Population as % of State Total	Survey Responses	Responses as % of Adult Population	Survey Responses as % of Total State Responses (n = 1,097)	Total County Mailings	Responses as % of Total County Mailings	Mailings as % of Adult Population
Bernalillo	415,838	30.60	124	0.03	11.30	394	31.5	0.09
Catron	2,795	0.19	10	0.36	0.91	21	47.6	0.75
Chaves	43,520	3.37	38	0.09	3.46	125	30.4	0.29
Cibola	17,737	1.41	33	0.19	3.01	75	44.0	0.42
Colfax	10,628	0.78	26	0.24	2.37	70	37.1	0.66
Curry	31,486	2.48	49	0.16	4.47	100	49.0	0.32
De Baca	1,700	0.12	11	0.65	1.00	18	61.1	1.06
Doña Ana	122,801	9.60	49	0.04	4.47	113	43.4	0.09
Eddy	36,729	2.84	36	0.10	3.28	99	36.4	0.27
Grant	22,879	1.70	55	0.24	5.01	130	42.3	0.57
Guadalupe	3,538	0.26	12	0.34	1.09	36	33.3	0.42
Harding	646	0.04	6	0.93	0.55	18	33.3	2.79
Hidalgo	4,052	0.33	16	0.39	1.46	30	53.3	0.74
Lea	38,802	3.05	54	0.14	4.92	132	40.9	0.34
Lincoln	15,005	1.07	36	0.24	3.28	87	41.4	0.58
Los Alamos	13,611	1.01	16	0.12	1.46	38	42.1	0.28
Luna	17,511	1.38	25	0.14	2.28	67	37.3	0.38
McKinley	46,375	4.11	20	0.04	1.82	71	28.2	0.15
Mora	3,797	0.28	11	0.29	1.00	29	37.9	0.76
Otero	43,920	3.42	34	0.08	3.10	78	43.6	0.18

Table 2. Adult population, survey respondents and total mailings by county (continued).

County	Adult Population*	Adult Population as % of State Total	Survey Responses	Responses as % of Adult Population	Survey Responses as % of Total State Responses (n = 1,097)	Total County Mailings	Responses as % of Total County Mailings	Mailings as % of Adult Population
Quay	7,616	0.56	48	0.63	4.38	102	47.1	1.34
Rio Arriba	29,410	2.26	37	0.13	3.37	95	38.9	0.32
Roosevelt	12,955	0.99	25	0.19	2.28	73	34.3	0.56
Sandoval	63,295	4.94	36	0.06	3.28	91	39.6	0.14
San Juan	76,702	6.26	50	0.07	4.56	112	44.6	0.15
San Miguel	21,871	1.66	20	0.09	1.82	59	33.9	0.27
Santa Fe	98,133	7.11	79	0.08	7.20	242	32.6	0.25
Sierra	10,603	0.73	28	0.26	2.55	46	60.9	0.43
Socorro	12,944	0.99	25	0.19	2.28	73	34.3	0.56
Taos	22,634	1.65	23	0.10	2.10	98	23.5	0.43
Torrance	11,770	0.93	18	0.15	1.64	59	30.5	0.50
Union	3,034	0.23	28	0.92	2.55	49	57.1	1.62
Valencia	46,240	3.64	19	0.04	1.73	45	42.2	0.10

* Source: Bureau of Business and Economic Research, University of New Mexico, http://www.unm.edu/~bber/.

planning efforts. A number of e-mail and mail letters received from survey participants expressed concerns about development and its impact on smaller communities in the state.

The individuals on the mailing list also would be expected to have some familiarity with New Mexico State University (NMSU) and, specifically, with the Cooperative Extension Service. Attitudes toward NMSU and Extension may have influenced the willingness of individuals to complete the questionnaire and return it to NMSU. People with a more positive attitude toward NMSU might have been more likely to return the questionnaire. However, those with negative attitudes might have been "turned off" by the affiliation. The mailing also clearly identified the principal investigator as being affiliated with NMSU's College of Agriculture and Home Economics. This affiliation may have reduced responses from state residents who believe that the college is tied too closely to agriculture, especially the range livestock industry. These people might have assumed the study was designed to protect and preserve the current position of natural resource-based industries in the state.

In addition, a social desirability bias may be present in the results, although as with other possible sources of bias, it cannot be detected with the data available. If respondents felt that it was more socially desirable or politically correct to express pro-environmental opinions, they could have answered the survey questions in a manner consistent with what they perceive to be conventional popular opinion. Alternatively, there may have been agriculturally based respondents who declined to express more pro-environmental attitudes for fear of endangering their own business or industry's position. Thus, some respondents may have felt it would be unpopular, socially unacceptable or potentially threatening to answer in accordance with their true beliefs.

During the course of surveying, the principal investigator had telephone communication with a community activist in the north-central region. This person stated that several people who had received the survey were suspicious of the study's motives and were concerned that providing any information would further endanger their water rights claims. Thus, responses from that region may have been reduced as a result of numerous, on-going natural resource disputes and controversies.

An additional source of bias may have arisen as a result of the New Mexico Farm and Livestock Bureau's reaction to the study.

After the survey packets had been mailed in summer 2000, the organization's executive vice president contacted the principal investigator to request information about the project. He was provided with full information and responded with the letter included in appendix C. His comparison of this study with the positions of various environmental groups (e.g., the Center for Biological Diversity, Earth First) could have reduced the number of responses or otherwise impacted the responses from the farm and ranch community. Alternatively, the executive director of New Mexico Water Dialogue corresponded with the principal investigator and expressed concern that the study would be biased toward economic development and growth. She said the survey was unnecessary because of recent similar efforts by the New Mexico Conservation Voters Alliance/League of Conservation Voters. Her correspondence also is presented in appendix C. Her reaction to the project may have been common among individuals leaning more toward conservation and environmentalism who may have chosen to not complete and return the questionnaire.

The individuals who were selected to receive a survey packet could best be described as involved in their communities. Several could be characterized as elites, leaders or influentials. Many were average citizens, except for having an above-average interest in their communities and the state. The educational level of survey respondents was relatively high, as was their income. This was not a survey of the general public. Thus, the study's results do not reflect the opinions of the general public. Instead, they reflect opinions of relatively attentive people who are more likely to be involved in environmental policy and regulations, economic development and planning initiatives throughout the state.

MAIL SURVEY FREQUENCY RESULTS

Tables of frequency results for all information collected in the survey are presented here. These results are based on responses to 1,100 completed questionnaires. Total responses vary for the different survey items due to nonresponses or refusals to provide answers to selected questions. Basic frequency counts for survey items from Parts I–VI of the questionnaire are shown in tables 3–9. The more notable frequency results are discussed below. As described previously, the scale of responses to Parts I–IV survey items ranged from "strongly disagree" (coded as 1) to "strongly agree" (coded as 5).

“Don’t know” responses were coded as “3s,” and represented an undecided, unable to decide or neutral response. Thus, a “2” response indicated weaker disagreement, and a “4” response indicated weaker agreement.

Table 3 summarizes opinions about agriculture and water quality issues. The three items (#s 4, 5, 6) that have been used extensively in previous studies as indicators of farm fundamentalist attitudes showed a relatively strong presence of that belief system. More than 81% of the respondents agreed or strongly agreed that “Agriculture is the most basic occupation in our society, and almost all other occupations depend on it.” Almost 88% agreed or strongly agreed that “All of us depend on farming and ranching for our basic necessities,” while 78.6% agreed or strongly agreed that “Family farms and ranches must be preserved because they are a vital part of our heritage.” Even though the respondents’ attitudes toward agriculture tended to be relatively sympathetic, 83.9% of the respondents were in agreement with the statement that “New Mexico farmers and ranchers do not have the right to damage water quality,” (item #13). Furthermore, approximately half of the respondents disagreed or strongly disagreed that hunger will result if water quality laws are enforced throughout the United States (item #11) or that enforcing water quality laws will destroy family farming and ranching in New Mexico (item #12). Almost 60% disagreed or strongly disagreed that they were more concerned about the survival of farming and ranching than they were about the environment (item #15).

In table 4, the highest levels of group disagreement were found for the statements related to government’s role in dealing with environmental or natural resource problems (#s 3, 21 and 22). Sixty-five percent, 67.1%, and 73.7% of the respondents strongly disagreed or disagreed with statements #3, #21 and #22, respectively. These statements were worded such that disagreement indicates skepticism regarding government’s role. Sixty-three percent agreed or strongly agreed that New Mexico communities will be better off through decisions made by local residents (item #20), while 80.9% agreed or strongly agreed that if an industry cannot control its pollution, the government should become involved (item #23). Survey item #30, “Environmental regulations are absolutely necessary,” had 71.1% of the respondents in agreement or strong agreement. While results for the preceding statements would tend to indicate support for government’s role in

Table 3. Opinions about agriculture and water quality (n = 1,100).

Item	Strongly Disagree #	(%)	Disagree #	(%)	Don’t Know #	(%)	Agree #	(%)	Strongly Agree #	(%)	Total Responses #	(%)	No Responses #
1. Agricultural landowners will voluntarily reduce water pollution.	112	(10.4)	308	(28.5)	260	(24.1)	299	(27.7)	101	(9.4)	1,080	(100.0)	20
2. The New Mexico ag community’s compliance with environmental regulations has been poor.	112	(10.3)	260	(23.9)	478	(43.9)	184	(16.9)	54	(5.0)	1,088	(100.0)	12
3. Farmers should be required to reduce their use of farm chemicals to protect water resources.	79	(7.3)	207	(19.1)	205	(18.9)	379	(34.9)	215	(19.8)	1,085	(100.0)	15
4. Agriculture is the most basic occupation in our society, and almost all other occupations depend on it.	27	(2.5)	104	(9.6)	70	(6.5)	450	(41.5)	434	(40.0)	1,085	(100.0)	15
5. All of us depend on farming and ranching for our basic necessities.	21	(1.9)	76	(7.0)	43	(4.0)	409	(37.7)	537	(49.5)	1,086	(100.0)	14
6. Family farms and ranches must be preserved because they are a vital part of our heritage.	37	(3.4)	121	(11.1)	75	(6.9)	332	(30.5)	524	(48.1)	1,089	(100.0)	11
7. Agricultural water pollution is a serious threat to fish and wildlife.	137	(12.6)	233	(21.5)	283	(26.1)	270	(24.9)	163	(15.0)	1,086	(100.0)	14
8. Agriculture is being unfairly blamed as a cause of water quality problems.	58	(5.3)	219	(20.1)	312	(28.7)	307	(28.2)	193	(17.7)	1,089	(100.0)	11
9. Water pollution from farming and ranching can best be controlled through educating farmers and ranchers.	30	(2.8)	90	(8.3)	119	(11.0)	480	(44.3)	364	(33.6)	1,083	(100.0)	17
10. If farmers and ranchers don’t do more to protect water quality on their own, the government should require them to do so.	184	(16.9)	211	(19.4)	185	(17.0)	354	(32.6)	152	(14.0)	1,086	(100.0)	14
11. Hunger will result if water quality laws are enforced throughout the U.S.	220	(20.3)	346	(31.9)	340	(31.3)	111	(10.2)	69	(6.4)	1,086	(100.0)	14

Table 3. Opinions about agriculture and water quality (n = 1,100) (continued).

Item	Strongly Disagree # (%)	Disagree # (%)	Don't Know # (%)	Agree # (%)	Strongly Agree # (%)	Total Responses # (%)	No Responses #
12. Enforcing water quality laws will destroy family farming and ranching in New Mexico.	166 (15.3)	373 (34.4)	284 (26.2)	177 (16.3)	84 (7.8)	1,084 (100.0)	16
13. New Mexico farmers and ranchers do not have the right to damage water quality.	31 (2.9)	50 (4.7)	92 (8.6)	479 (44.7)	420 (39.2	1,072 (100.0)	28
14. New Mexico agriculture is an insignificant contributor to the national food supply.	347 (32.0)	326 (30.1)	184 (17.0)	156 (14.4)	70 (6.5)	1,083 (100.0)	17
15. I am more concerned about the survival of farming and ranching than I am about the environment.	234 (22.0)	397 (37.4)	142 (13.4)	194 (18.3)	96 (9.0)	1,063 (100.0)	37
16. I am willing to pay more for my food in order to protect the environment.	84 (7.8)	190 (17.7)	156 (14.5)	448 (41.7)	197 (18.3)	1,075 (100.0)	25

Table 4. Attitudes about government and government policies (n = 1,100).

Item	Strongly Disagree # (%)	Disagree # (%)	Don't Know # (%)	Agree # (%)	Strongly Agree # (%)	Total Responses # (%)	No Responses #
1. Water quality laws are a threat to private property rights in NM.	161 (14.9)	258 (23.8)	243 (22.4)	259 (23.9)	163 (15.0)	1,084 (100.0)	16
2. The water quality crisis has been greatly exaggerated.	148 (13.6)	249 (22.8)	279 (25.6)	274 (25.1)	140 (12.8)	1,090 (100.0)	10
3. I trust the government to make the proper decisions about water quality management.	344 (31.7)	358 (33.0)	145 (13.4)	202 (18.6)	36 (3.3)	1,085 (100.0)	15
4. The Federal government is doing a good job of regulating water quality.	242 (22.3)	321 (29.6)	357 (32.9)	150 (13.8)	16 (1.5)	1,086 (100.0)	14
5. The State government is doing a good job of regulating water quality.	176 (16.1)	309 (28.3)	381 (34.9)	206 (18.9)	19 (1.7)	1,091 (100.0)	9
6. Scientists are able to make accurate estimates of the risks of water quality problems.	84 (7.7)	190 (17.5)	308 (28.4)	434 (40.0)	70 (6.5)	1,086 (100.0)	14
7. Tourism in NM will increase if we protect and preserve our water resources.	83 (7.6)	175 (16.1)	315 (29.0)	371 (34.1)	143 (13.2)	1,087 (100.0)	13
8. Current scientific information should decide the outcome of environmental disputes.	88 (8.2)	207 (19.2)	304 (28.2)	374 (34.6)	107 (9.9)	1,080 (100.0)	20
9. The economies of local communities should be given the highest priority when making decisions about water quality policy.	66 (6.1)	277 (25.5)	141 (13.0)	387 (35.6)	216 (19.9)	1,087 (100.0)	13
10. I am pessimistic about the future of water quality in New Mexico.	109 (10.1)	399 (36.9)	188 (17.4)	303 (28.1)	81 (7.5)	1,080 (100.0)	20
11. The public needs to be educated about the costs of environmental regulations.	12 (1.1)	13 (1.2)	41 (3.8)	471 (43.4)	548 (50.5	1,085 (100.0)	15
12. Strong environmental regulations are damaging our state's economy.	112 (10.3)	243 (22.4)	294 (27.2)	237 (21.9)	197 (18.2)	1,083 (100.0)	17
13. The government will have a difficult time enforcing water quality regulations in NM.	46 (4.3)	220 (20.4)	335 (31.0)	351 (32.5)	129 (11.9)	1,081 (100.0)	19

Table 4. Attitudes about government and government policies (n = 1,100) (continued).

Item	Strongly Disagree #	Strongly Disagree (%)	Disagree #	Disagree (%)	Don't Know #	Don't Know (%)	Agree #	Agree (%)	Strongly Agree #	Strongly Agree (%)	Total Responses #	Total Responses (%)	No Responses #
14. We should do more to protect the environment even if it means losing jobs.	220	(20.4)	366	(34.0)	214	(19.9)	220	(20.4)	57	(5.3)	1,077	(100.0)	23
15. The benefits of water quality improvement outweigh the costs.	94	(8.7)	189	(17.5)	309	(28.7)	346	(32.1)	140	(13.0)	1,078	(100.0)	22
16. The government's water quality standards are unrealistically high.	70	(6.5)	190	(17.5)	471	(43.5)	215	(19.9)	137	(12.7)	1,083	(100.0)	17
17. NM needs tougher government regulations on business to protect the environment.	190	(17.6)	247	(22.8)	277	(25.6)	244	(22.6)	124	(11.5)	1,082	(100.0)	18
18. It is worth paying more taxes in order to protect the environment.	152	(14.1)	271	(25.1)	147	(13.6)	378	(34.9)	134	(12.4)	1,082	(100.0)	18
19. I'm afraid my drinking water supply is contaminated.	443	(40.9)	333	(30.8)	133	(12.3)	113	(10.4)	60	(5.5)	1,082	(100.0)	18
20. Communities in NM will be better off through decisions made by local residents.	57	(5.3)	187	(17.4)	152	(14.1)	363	(33.7)	318	(29.5)	1,077	(100.0)	23
21. To prevent the destruction of natural resources, the government must control private land use.	449	(41.5)	277	(25.6)	124	(11.5)	168	(15.5)	65	(6.0)	1,083	(100.0)	17
22. The primary responsibility for solving environmental problems lies with government rather than individuals.	386	(35.9)	396	(36.8)	97	(9.0)	153	(14.2)	43	(4.0)	1,075	(100.0)	25
23. If an industry cannot control, its pollution, the government should become involved.	56	(5.2)	82	(7.6)	69	(6.4)	566	(52.3)	310	(28.6)	1,083	(100.0)	17
24. Regulation of business by government usually does more harm than good.	76	(7.0)	267	(24.7)	212	(19.6)	292	(27.0)	236	(21.8)	1,083	(100.0)	17
25. Government regulations always lead to too much bureaucracy.	43	(4.0)	176	(16.2)	118	(10.9)	359	(33.1)	388	(35.8)	1,084	(100.0)	16

Table 4. Attitudes about government and government policies (n = 1,100) (continued).

Item	Strongly Disagree #	Strongly Disagree (%)	Disagree #	Disagree (%)	Don't Know #	Don't Know (%)	Agree #	Agree (%)	Strongly Agree #	Strongly Agree (%)	Total Responses #	Total Responses (%)	No Responses #
26. The government has too much power over citizens.	59	(5.5)	224	(20.7)	128	(11.8)	340	(31.4)	332	(30.7)	1,083	(100.0)	17
27. People in my community will resist more environmental regulations.	36	(3.3)	162	(14.9)	280	(25.8)	367	(33.8)	240	(22.1)	1,085	(100.0)	15
28. Current environmental laws are concise and effective.	220	(20.3)	346	(31.9)	365	(33.7)	129	(11.9)	24	(2.2)	1,084	(100.0)	16
29. Environmental regulations in NM are too weak.	144	(13.2)	307	(28.2)	425	(39.1)	141	(13.0)	71	(6.5)	1,088	(100.0)	12
30. Environmental regulations are absolutely necessary.	59	(5.5)	122	(11.3)	132	(12.2)	511	(47.3)	257	(23.8)	1,081	(100.0)	19
31. Many New Mexicans will resist enforcement of more water quality laws in this state.	19	(1.8)	128	(11.8)	289	(26.7)	469	(43.4)	177	(16.4)	1,082	(100.0)	18
32. Government should use all available means to protect the environment.	190	(17.6)	313	(29.0)	161	(14.9)	284	(26.3)	133	(12.3)	1,081	(100.0)	19
33. Limits should be placed on water-based recreation in order to improve water quality.	132	(12.2)	274	(25.2)	271	(25.0)	305	(28.1)	104	(9.6)	1,086	(100.0)	14
34. Improvements in water quality will benefit tourism and recreation industries in NM.	60	(5.5)	148	(13.6)	314	(28.9)	424	(39.0)	141	(13.0)	1,087	(100.0)	13
35. Enforcement of clean water regulations in NM will hurt businesses in the state.	104	(9.6)	404	(37.2)	333	(30.7)	182	(16.8)	63	(5.8)	1,086	(100.0)	14
36. More environmental laws will mean fewer jobs in NM.	114	(10.5)	297	(27.3)	359	(33.0)	179	(16.4)	140	(12.9)	1,089	(100.0)	11

improving environmental policy, 68.9% of the respondents agreed or strongly agreed that government regulations lead to too much bureaucracy (item #25), and 62% agreed or strongly agreed with the statement "The government has too much power over citizens" (item #26). When presented with the statement that "I'm afraid my drinking water supply is contaminated," 71.7% of the respondents disagreed or strongly disagreed (item #19). One of the more extreme results from Part II was for item #11, which showed strong group agreement (93.9% agreed or strongly agreed) with the statement that the public needs to be educated about the costs of environmental regulations. Almost 60% of the respondents agreed or strongly agreed that "Many New Mexicans will resist enforcement of more water quality laws in the state" (item #31).

Part III survey items addressed several issues related to water quality policy in New Mexico and are summarized in table 5. Many of the responses were in the "don't know" or neutral range. However, a high percentage of respondents agreed with the statement that the state's water polluters should pay the costs of enforcing water quality regulations (e.g., 77.2% agreed or strongly agreed, item #18). More than 70% disagreed or strongly disagreed that the public in New Mexico has a good understanding of the state's water issues (item #9), and 69.9% agreed (strongly or moderately) that public education campaigns on the state's water issues would increase the public's acceptance of water regulations (item #10). Eighty-two percent of the respondents agreed (strongly or moderately) with the statement that state residents should have more say in important environmental decisions (item #5).

Part IV (table 6) survey items were designed to assess overall environmental attitudes. There was a relatively strong rejection (78.7% strongly or moderately disagreeing) of the statement that "We shouldn't worry about environmental problems because science and technology will soon solve them" (item #9). Sixty-six percent strongly disagreed or disagreed with the statement that "Environmental protection is so important that regulations cannot be too strict," although 21% of the respondents agreed with item #8. Almost 60% of the respondents strongly disagreed or disagreed that there are serious environmental problems where they live (item #1), while 56.4% strongly disagreed or disagreed that technological development is destroying nature (item #2). Two-thirds of the respondents rejected the notion that environmental protection will

threaten their jobs (item #12), but 59.8% also disagreed or strongly disagreed with the notion that humans have the right to exploit the natural environment for human benefit (item #15).

There was a consistent agreement or strong agreement level (approximately 60%) with items #4, 5, 10 and 11. Agreement with these items is consistent with New Environmental Paradigm attitudes or sentiments.

Results for Part V of the survey questionnaire are summarized in table 7. Almost half of the respondents (46.4%) declined to assess the quality of data being used in developing and implementing water quality policies in New Mexico (item #1), while 32.6% said the data were very good or fairly good and 20.9% expressed negative opinions of the data. Seventy-one percent indicated New Mexico groundwater is of good quality (item #2), and 58.0% opined that New Mexico surface water quality is good.

When asked if the state and federal governments should change the amount of resources currently put into improving water quality, 53.9% indicated more resources are needed, 38.1% reported that the current level of resources is acceptable, and 8% believed that fewer resources should be used (table 7, item #4). Almost 39% of the respondents said that "laws have gone too far" in protecting the environment, 31.7% felt that "laws have struck the right balance," and 29.6% believe that "laws have not gone far enough" (item #5). Slightly more than 16% of the respondents believed that the 1972 Clean Water Act should be revoked or weakened, while 41.4% stated that the act should remain unchanged, and 42.3% believed that it should be strengthened to protect water quality (item #6).

Part VI of the questionnaire asked respondents to provide personal information; responses are reported in tables 8 and 9. Table 8 presents results for general opinion, knowledge and industry involvement questions. When asked to assess their familiarity with the 1972 Clean Water Act, 31.7% of the respondents indicated they were "not familiar at all" with the act, 60.4% said they were "somewhat familiar," and 7.9% reported being "very knowledgeable." Fifty-eight percent reported they were not at all familiar with the Clean Water Act's Total Maximum Daily Load provisions, 36.5% were "somewhat familiar" with the TMDL provisions, and 5.4% stated they were very knowledgeable of them.

Table 5. Opinions about water quality policy in New Mexico (n = 1,100).

Item		Strongly Disagree #	(%)	Disagree #	(%)	Don't Know #	(%)	Agree #	(%)	Strongly Agree #	(%)	Total Responses #	(%)	No Responses #
1.	Public participation in the water quality regulation process in NM is adequate.	137	(12.6)	375	(34.4)	381	(35.0)	153	(14.0)	44	(4.0)	1,090	(100.0)	10
2.	It is difficult to obtain water quality data from government agencies in NM.	41	(3.8)	181	(16.6)	584	(53.7)	197	(18.1)	85	(7.8)	1,088	(100.0)	12
3.	Many people involved in water quality issues in NM don't understand technical information.	19	(1.7)	89	(8.2)	405	(37.2)	389	(35.7)	187	(17.2)	1,089	(100.0)	11
4.	New Mexico's water quality problems can best be resolved at the grass-roots level.	45	(4.1)	191	(17.5)	230	(21.1)	430	(39.5)	193	(17.7)	1,089	(100.0)	11
5.	The people of the state should have more say in important environmental decisions.	14	(1.3)	58	(5.3)	120	(11.0)	591	(54.3)	306	(28.1)	1,089	(100.0)	11
6.	I don't know who to talk to and get information from about NM water quality issues.	210	(19.3)	359	(33.1)	118	(10.9)	277	(25.5)	122	(11.2)	1,086	(100.0)	14
7.	The public isn't adequately informed about meetings that have to do with water quality regulations.	68	(6.3)	218	(20.0)	246	(22.6)	359	(33.0)	197	(18.1)	1,088	(100.0)	12
8.	I am actively involved in water issues in my community.	139	(12.9)	253	(23.4)	84	(7.8)	367	(34.0)	238	(22.0)	1,081	(100.0)	19
9.	The general public in NM has a good understanding of the state's water issues.	319	(29.4)	450	(41.4)	216	(19.9)	84	(7.7)	18	(1.7)	1,087	(100.0)	13
10.	Public education campaigns on New Mexico's water issues would increase the public's acceptance of water regulations.	33	(3.1)	85	(7.9)	208	(19.2)	538	(49.8)	217	(20.1)	1,081	(100.0)	19
11.	Public input keeps the state government from impartially administering water policy.	88	(8.1)	210	(19.4)	296	(27.3)	355	(32.7)	136	(12.5)	1,085	(100.0)	15

Table 5. Opinions about water quality policy in New Mexico (n = 1,100) (continued).

Item		Strongly Disagree #	(%)	Disagree #	(%)	Don't Know #	(%)	Agree #	(%)	Strongly Agree #	(%)	Total Responses #	(%)	No Responses #
12.	New Mexico officials who administer environmental regulations lack expertise.	43	(4.0)	188	(17.3)	550	(50.6)	184	(16.9)	121	(11.1)	1,086	(100.0)	14
13.	Government should bear the costs of environmental protection.	71	(6.6)	290	(27.0)	242	(22.5)	313	(29.1)	158	(14.7)	1,074	(100.0)	26
14.	The presence of instream flows is a good measure of the health of a river.	90	(8.3)	139	(12.9)	582	(53.8)	197	(18.2)	74	(6.8)	1,082	(100.0)	18
15.	Government regulations to protect NM rivers have been cost effective.	111	(10.2)	177	(16.3)	692	(63.7)	84	(7.7)	22	(2.0)	1,086	(100.0)	14
16.	Industries in NM have done a good job complying with current water quality regulations.	80	(7.4)	219	(20.2)	507	(46.7)	240	(22.1)	39	(3.6)	1,085	(100.0)	15
17.	Inadequate funding has reduced New Mexico's ability to comply with current water quality regulations.	34	(3.1)	95	(8.8)	552	(50.9)	295	(27.2)	109	(10.1)	1,085	(100.0)	15
18.	The state's water polluters should pay the costs of enforcing water quality regulations.	25	(2.3)	81	(7.5)	141	(13.0)	554	(51.2)	282	(26.0)	1,083	(100.0)	17
19.	The state's watersheds would be in poor condition if not for current water quality regulations.	93	(8.6)	146	(13.5)	499	(46.1)	261	(24.1)	84	(7.8)	1,083	(100.0)	17

Table 6. Environmental attitudes and beliefs (n = 1,100).

Item	Strongly Disagree #	(%)	Disagree #	(%)	Don't Know #	(%)	Agree #	(%)	Strongly Agree #	(%)	Total Responses #	(%)	No Responses #
1. There are serious environmental problems where I live.	236	(21.6)	416	(38.1)	109	(10.0)	237	(21.7)	94	(8.6)	1,092	(100.0)	8
2. Technological development is destroying nature.	225	(20.8)	386	(35.6)	224	(20.7)	188	(17.3)	61	(5.6)	1,084	(100.0)	16
3. I would be willing to reduce my standard of living to help protect nature.	146	(13.5)	260	(24.0)	221	(20.4)	364	(33.6)	93	(8.6)	1,084	(100.0)	16
4. I am attracted to the spiritual qualities of nature.	128	(11.9)	144	(13.4)	162	(15.0)	454	(42.1)	190	(17.6)	1,078	(100.0)	22
5. It bothers me that the world's natural environment is changing so quickly.	92	(8.5)	210	(19.5)	130	(12.1)	424	(39.4)	221	(20.5)	1,077	(100.0)	23
6. All species have an equal right to co-exist on the planet.	218	(20.1)	243	(22.4)	119	(11.0)	304	(28.0)	201	(18.5)	1,085	(100.0)	15
7. People in NM are too concerned about small environmental problems and risks.	86	(7.9)	300	(27.6)	307	(28.3)	275	(25.3)	118	(10.9)	1,086	(100.0)	14
8. Environmental protection is so important that regulations cannot be too strict.	395	(36.2)	325	(29.8)	141	(12.9)	166	(15.2)	63	(5.8)	1,090	(100.0)	10
9. We shouldn't worry about environmental problems because science and technology will soon solve them.	370	(34.0)	487	(44.7)	152	(14.0)	62	(5.7)	18	(1.7)	1,089	(100.0)	11
10. The balance of nature is very delicate and easily upset.	83	(7.6)	249	(22.8)	132	(12.1)	371	(34.0)	255	(23.4)	1,090	(100.0)	10
11. When humans interfere with nature, it often produces disastrous consequences.	82	(7.6)	245	(22.6)	124	(11.4)	417	(38.4)	217	(20.0)	1,085	(100.0)	15
12. Protecting the environment will threaten jobs for people like me.	296	(27.4)	418	(38.6)	175	(16.2)	130	(12.0)	63	(5.8)	1,082	(100.0)	18
13. I am confused about what's good and what's bad for the environment.	240	(22.2)	415	(38.4)	145	(13.4)	215	(19.9)	67	(6.2)	1,082	(100.0)	18
14. Humans are severely abusing the environment.	161	(14.8)	295	(27.2)	127	(11.7)	336	(31.0)	166	(15.3)	1,085	(100.0)	15
15. Humans have the right to exploit the natural environment for human benefit.	294	(27.2)	353	(32.6)	114	(10.6)	245	(22.7)	75	(6.9)	1,082	(100.0)	19

Table 7. General opinion questions (n = 1,100).

Item	#	(%)	Total Responses #	(%)	No Response #
1. How would you rank the quality of data being used in the development and implementation of water quality policies in NM?			**1,081**	**(100.0)**	**19**
Very good	22	(2.0)			
Fairly good	331	(30.6)			
Fairly bad	159	(14.7)			
Very bad	67	(6.2)			
Don't know	502	(46.4)			
2. How would you rank the quality of groundwater in NM?			**1,079**	**(100.0)**	**21**
Very good	125	(11.6)			
Fairly good	644	(59.7)			
Fairly bad	131	(12.1)			
Very bad	30	(2.8)			
Don't know	149	(13.8)			
3. How would you rank the quality of surface water in NM?			**1,083**	**(100.0)**	**17**
Very good	68	(6.3)			
Fairly good	560	(51.7)			
Fairly bad	233	(21.5)			
Very bad	53	(4.9)			
Don't know	169	(15.6)			
4. Should the State and Federal governments put more, the same amount, or fewer resources into improving water quality?			**1,050**	**(100.0)**	**50**
More resources	566	(53.9)			
The same resources	400	(38.1)			
Fewer resources	84	(8.0)			

Table 7. General opinion questions (n = 1,100) (continued).

Item	# (%)	Total Responses # (%)	No Response #
5. In your opinion, have current environmental laws and regulations gone too far, or not far enough, or have struck the right balance in protecting the environment?		**1,013 (100.0)**	**87**
Laws have gone too far	392 (38.7)		
Laws have struck the right balance	321 (31.7)		
Laws have not gone far enough	300 (29.6)		
6. In the best interests of the Nation, the 1972 Federal Clean Water Act should be…		**923 (100.0)**	**177**
Revoked	84 (9.1)		
Weakened to provide less water quality protection	67 (7.3)		
Remain unchanged	382 (41.4)		
Strengthened to protect water quality	390 (42.3)		

When asked to assess their general knowledge of water issues, 14.5% said they were "unknowledgeable," but almost half (47.1%) reported being "informed." Almost 29% stated they were "knowledgeable," and 9.7% reported they were "very knowledgeable." The respondents were asked to indicate the area of water issues about which they knew the most. Almost 44% reported municipal supply as the area about which they had the greatest knowledge, while 30.5% said they were most knowledgeable about irrigation systems issues, and 26.3% stated they knew the most about social issues as they related to water issues. Almost 62% of the respondents said they obtain most of their information about environmental issues from newspapers and magazines. Government agencies were reported as the primary source of environmental issues information by 38.5% of the respondents. Television and radio were named as the main sources of information by 25.7%, while friends, family members and the Internet were reported with less frequency.

Table 8. Water policy and issues information from the respondents (n = 1,100).

Item	# (%)	Total Responses # (%)	No Response #
1. How familiar are you with provisions of the 1972 Federal Clean Water Act?		**1,086 (100.0)**	**14**
Not familiar at all	344 (31.7)		
Somewhat familiar	656 (60.4)		
Very knowledgeable	86 (7.9)		
2. How familiar are you with the Total Maximum Daily Load provisions of the 1972 Federal Clean Water Act?		**1,085 (100.0)**	**15**
Not familiar at all	630 (58.1)		
Somewhat familiar	396 (36.5)		
Very knowledgeable	59 (5.4)		
3. How would you assess your general knowledge of water issues?		**1,087 (100.0)**	**13**
Unknowledgeable	158 (14.5)		
Informed	512 (47.1)		
Knowledgeable	312 (28.7)		
Very knowledgeable	105 (9.7)		
4. In what area of water issues are you the most knowledgeable?			
Policy	209 (20.7)	1,010	90
Hydrology	105 (10.4)	1,010	90
Biology	78 (7.7)	1,010	90
Environmental science	97 (9.6)	1,010	90
Law	92 (9.1)	1,010	90
Ecology	112 (11.1)	1,010	90
Irrigation systems	308 (30.5)	1,010	90
Municipal supply	440 (43.6)	1,009	91
Engineering	62 (6.1)	1,010	90
Economics	177 (17.5)	1,010	90
Social issues	266 (26.3)	1,010	90
History	154 (15.3)	1,010	90
Other	76 (7.5)	1,009	91

Table 8. Water policy and issues information from the respondents (n = 1,100).

Item	#	(%)	Total Responses #	(%)	No Response #
5. Where do you get most of your information about environmental issues?					
Friends and family members	98	(9.1)	1,083		17
Government agencies	417	(38.5)	1,083		17
Newspapers and magazines	668	(61.7)	1,083		17
Television and radio	278	(25.7)	1,083		17
Internet	85	(7.9)	1,083		17
Other	86	(7.9)	1,083		17
6. Do you, or any member of your immediate family depend on the following industries for your livelihood?					
Timber	64	(6.0)	1,064		36
Livestock	266	(25.0)	1,064		36
Agriculture (crop production)	226	(21.2)	1,064		36
None of the above	711	(66.8)	1,064		36
7. On domestic policy issues, would you consider yourself to be:			1,084		16
Very liberal	19	(1.8)			
Liberal–moderate	209	(19.3)			
Moderate	291	(26.9)			
Moderate–conservative	486	(44.8)			
Very conservative	79	(7.3)			

When asked if they or any member of their immediate family depend on timber, livestock or crop production for their livelihood, two-thirds (66.8%) of the respondents said "no." Respondents also were asked to identify their political orientation using a very liberal to very conservative scale. According to the results, 1.8% said they were very liberal, 19.3% identified themselves as moderate liberals, and 26.9% described themselves as moderates. The largest response category was for moderate conservatives, into which 44.8% of the surveyed group placed themselves, while 7.3% indicated they were very conservative.

Basic sociodemographic information obtained from the survey respondents in Part VI of the instrument is summarized in table 9. With respect to educational attainment, 44.7% of the surveyed group reported holding a graduate degree or having done some graduate work. Another 21.1% said they had completed a bachelor's degree, while 23.7% indicated they had taken some college courses. Almost 10% reported they had completed high school only. Less than 1% had not graduated from high school.

Almost 27% of the respondents reported a "rural place" as their place of residence. Another 16.1% reported living in towns of 2,500 or less. Approximately 18% live in cities with populations greater than 50,000.

Forty-one percent of the respondents were between the ages of 31 and 50, 48.8% were between the ages of 51 and 70, 2.5% were younger than 30, and 7.7% were older than 70. Almost three-fourths (73.6%) of the respondents were male. Almost 69% of the respondents described their ethnic heritage as Anglo, while 23.1% indicated they were Hispanic. Native American respondents comprised 3.8% of the total, while African-Americans and Asian-Americans made up 0.5% and 0.2% of respondents, respectively. Another 3.9% of respondents described their ethnic heritage as "other."

A total annual household income of less than $20,000 per year was reported by 4.5% of the respondents. Another 15.9% had a total annual household income between $20,000 and $40,000, and 25.2% were between $41,000 and $60,000. Households with incomes in the range of $61,000 and $80,000 accounted for 21.5%, while $81,000–$100,000 per year households made up 15.4%. The highest income category of greater than $100,000 per year included 17.5% of the respondents, and 7.6% refused to answer the question.

Table 9. Sociodemographic information about the respondents (n = 1,100).

Item	#	(%)	Total Responses #	Total Responses (%)	No Response #
1. What is your highest level of education?			1,092	(100.0)	8
Never attended school	0	(0.0)			
Some grade school	1	(0.1)			
Completed grade school	3	(0.3)			
Some high school	4	(0.4)			
Completed high school	107	(9.8)			
Some college	259	(23.7)			
Completed a bachelor's degree	230	(21.1)			
Some graduate work	163	(14.9)			
An advanced degree (M.S., Ph.D., etc.)	325	(29.8)			
2. How old are you?			1,086	(100.0)	14
Younger than 20 years	0	(0.0)			
20–30 years	27	(2.5)			
31–40 years	101	(9.3)			
41–50 years	344	(31.7)			
51–60 years	340	(31.3)			
61–70 years	190	(17.5)			
71 or older	84	(7.7)			
3. What is your gender?			1,083	(100.0)	17
Male	797	(73.6)			
Female	286	(26.4)			
4. What is your ethnic background?			1,067	(100.0)	33
Anglo	732	(68.6)			
Hispanic	246	(23.1)			
African-American	5	(0.5)			
Asian	2	(0.2)			
Native American	40	(3.8)			
Other	42	(3.9)			
5. Which of the following best describes your place of residence?			1,087	(100.0)	13
Rural area	292	(26.9)			
Town of 2,500 or less	175	(16.1)			
City of 2,501–25,000	286	(26.3)			
City of 25,001–50,000	137	(12.6)			
City of 50,001–100,000	90	(8.3)			
City of over 100,000	107	(9.8)			

Table 9. Sociodemographic information about the respondents (n = 1,100) (continued).

Item	#	(%)	Total Responses #	Total Responses (%)	No Response #
6. Please estimate your total household income, from all sources.			1,016	(100.0)	84
Less than $20,000 per year	46	(4.5)			
$20,000–$40,000 per year	162	(15.9)			
$41,000–$60,000 per year	256	(25.2)			
$61,000–$80,000 per year	218	(21.5)			
$81,000–$100,000 per year	156	(15.4)			
More than $100,000 per year	178	(17.5)			

DEVELOPMENT OF ATTITUDINAL INDICATOR SCALES

Scale indicators were developed to combine several survey items into summary attitude indicators. Parts I, II, III and IV of the survey questionnaire were designed as item pools to elicit a diversity of opinions about agriculture and water quality (I), government and government policies (II), water quality policy in New Mexico (III), and environmental attitudes and beliefs (IV). It was initially assumed that items from Parts I-IV of the survey would be used in four attitudinal indicators, in each of the four subject areas listed above.

Likert attitude scaling was chosen for this study. In scoring positively stated Likert scale items, "strongly agree" responses are given a 5, "strongly disagree" are given a 1. The scoring is reversed for negatively stated items (where "strongly agree" equals 1, and "strongly disagree" equals 5). Survey item pools used to develop scales typically include both positively and negatively stated items. This requires that some items be reversed. For example, for a collection of survey items where 5s (i.e., strongly agree) indicate strong environmentalist beliefs, there should be some survey items worded such that 1s indicate environmentalist beliefs. Before constructing the summated scale, reversals must be undertaken such that all item scores point consistently in the same direction. In the example given here, the higher the total score (when summing across all items), the stronger the environmentalist beliefs (although the reversals could be undertaken such that the lower the total summed score, the stronger the environmentalist attitudes). In a five-point Likert scale, the highest possible scale score is 5 x n, where n is the number of items in the scale. The lowest possible scale score is 1 x n.

In this study, responses to some individual survey items were reversed to achieve directional consistency, and preliminary Likert scales were developed using the complete item pools from Parts I–IV. The Cronbach α indicator of reliability or internal consistency was calculated for each preliminary scale using SAS™ (Mueller, 1986).

Results for the preliminary Likert scales using Part I, II and IV items were more satisfactory than those using the Part III items, thus leading to questions about what underlying factor(s) the Part III questions had attempted to measure. Cronbach α results for the Part I, II and IV scales indicated relatively high degrees of internal consistency, although some items were less strongly correlated with the total scores than other items. Before a decision was made on the items to be included in the final Likert scales, a factor analysis was conducted.

FACTOR ANALYSIS

Factor analysis describes the covariance relationships among many variables in terms of a few underlying, but unobservable, random quantities called factors (Johnson and Wichern, 1992). The procedure groups (or loads) together variables that are highly correlated among themselves, but have relatively small correlations with variables in a different group (Johnson and Wichern, 1992). Thus, it is assumed there is some underlying construct or factor that is responsible for the observed correlations. Factor analysis was applied to the preliminary Likert scales to verify or reject the original notion that survey items in Parts I–IV were item pools that consistently measured or indicated similar constructs.

SAS™ software was used to conduct a factor analysis of the 86 items from Parts I-IV of the survey instrument. Results for 1,100 observations were subjected to the FACTOR procedure using the varimax rotation method. Factor analysis indicated that there was consistent and relatively strong loading on three separate factors for most of the survey items from Parts I, II and IV. Part III survey items loaded across several factors, and no common theme could be identified for more than four survey items. Thus, the decision was made to not use Part III items in an attitude scale.

FINAL ATTITUDINAL INDICATOR SCALES

The Part I attitudinal indicator was named *Agricultural Pollution*, with high values indicating a distrust of agriculture, the opinion that agriculture is a significant water pollution source, and the belief that agriculture threatens the environment. Low values of this indicator are reflective of favorable opinions of agriculture and beliefs that agriculture is not a significant water pollution source, nor a threat to the natural environment.

A few of the items in the indicator were designed to capture attitudes related to farm fundamentalism (see appendix A). Farm fundamentalism constructs have been used and are used here to examine attitudes that have helped to maintain the position of production agriculture as an industry to which "polluter pays" principles generally have not been applied.

Fifteen survey items were included in the final *Agricultural Pollution* scale indicator (listed in table 10), which thus had a maximum score of 75 and a minimum score of 15. The Cronbach α for the final *Agricultural Pollution* indicator was 0.84.

The Part II attitudinal indicator was named *Government Confidence* with high values indicating a more progovernment, proregulation and environmental activist stance or attitude. Higher values indicate beliefs that government has an important role in improving the environment and regulating economic activity to protect the environment. Lower *Government Confidence* values reflect attitudes that are more skeptical of government, regulations and bureaucracy. Lower *Government Confidence* scores also reflect beliefs that environmental regulations can be too costly and concerns about the expansion of government powers. Higher *Government Confidence* values indicate beliefs that environmental regulations are not costly or burdensome and that economic trade-offs in favor of environmental protection are worth the cost.

There were 27 survey items included in the *Government Confidence* indicator for a maximum score or 135 and a minimum score of 27. The Cronbach α for the final *Government Confidence* indicator was 0.94.

Table 10. Summary of attitudinal indicators.

Indicator Name:	Agricultural Pollution	Government Confidence	Environmentalism
Cronbach α:	0.84	0.94	0.86
Items:	Part I Q1	Part II Q1	Part IV Q1
	Part I Q2	Part II Q2	Part IV Q2
	Part I Q3	Part II Q3	Part IV Q3
	Part I Q4	Part II Q4	Part IV Q4
	Part I Q5	Part II Q6	Part IV Q5
	Part I Q6	Part II Q8	Part IV Q6
	Part I Q7	Part II Q9	Part IV Q7
	Part I Q8	Part II Q11	Part IV Q8
	Part I Q10	Part II Q12	Part IV Q9
	Part I Q11	Part II Q14	Part IV Q10
	Part I Q12	Part II Q15	Part IV Q11
	Part I Q13	Part II Q16	Part IV Q14
	Part I Q14	Part II Q17	Part IV Q15
	Part I Q15	Part II Q18	
	Part I Q16	Part II Q20	
	Part II Q21		
	Part II Q23		
	Part II Q24		
	Part II Q25		
	Part II Q26		
	Part II Q27		
	Part II Q29		
	Part II Q30		
	Part II Q32		
	Part II Q34		
	Part II Q35		
	Part II Q36		

The Part IV attitudinal indicator was named *Environmentalism*. High values of this scale indicate strong environmentalist beliefs, including attitudes that would rank environmental objectives higher than human or economic objectives and the belief that the natural environment is being damaged by human activities. High *Environmentalism* values are consistent with the New Environmental Paradigm. Higher scores for *Environmentalism* also reflect pessimistic attitudes about water quality and overall environmental conditions. Low *Environmentalism* values indicate in the opposite direction, toward less fear for the status of the natural environment, beliefs that human activities and goals supersede environmental ones, and that human domination of the natural environment is not undesirable.

There were 13 items included in the *Environmentalism* indicator, for a maximum score of 65 and a minimum score of 13. The Cronbach α for *Environmentalism* was 0.86.

Pearson correlation coefficients between the three attitude scales were 0.45 between *Agricultural Pollution* and *Environmentalism*, 0.46 between *Agricultural Pollution* and *Government Confidence*, and 0.63 between *Environmentalism* and *Government Confidence*.

ANALYSIS OF VARIANCE FOR ATTITUDE INDICATOR SCALES

Analysis of variance (ANOVA) was conducted to compare the attitude scale scores across a range of sociodemographic characteristics. The general hypothesis was that there would be differences in attitude scale values relative to sociodemographic factors, and numerous statistically significant differences were found. Mean attitude scale scores, standard deviations and one-way ANOVA *F*-ratios are shown in table 11. The analysis of variance was performed using PROC GLM routines in SAS™. The ANOVA procedures applied are described in detail in Hoshmand (1988).

Results indicated that rural residents tended to have more favorable attitudes toward agriculture and perceive fewer agricultural pollution problems, while urban residents had a significantly higher level of distrust and less sympathy for agriculture. *Environmentalism* scores did not exhibit a clear trend with respect to place of residence. Rural residents tended to have lower *Government Confidence* scores.

Respondents aged 61 years and older had a significantly lower mean score for *Agricultural Pollution*, possibly resulting from closer ties to production agriculture. Older people also had a significantly lower *Government Confidence* mean score. However, mean *Environmentalism* scores were not significantly different between age groups.

Significant differences in mean scores also were found for respondents based on educational attainment. The mean score for *Environmentalism* was significantly lower for respondents who had completed an undergraduate degree. Mean scores for *Agricultural Pollution* were significantly higher for respondents with the highest levels of educational attainment. The same pattern was found for mean *Government Confidence* scores, with faith in government's ability to deal with environmental problems higher for people who have attended graduate school or who have graduate degrees.

Table 11. Mean attitudinal indicator scores, standard deviations and ANOVA F-ratios for main effects.†

	Agricultural Pollution			Environmentalism			Government Confidence		
	Mean	SD	n††	Mean	SD	N	Mean	SD	n
Place of residence:									
Rural area	40.38 a	10.49	287	36.95 ab	8.51	290	71.70 a	21.21	282
Town of 2,500 or less	43.09 b	9.17	172	38.25 bcd	7.55	174	74.99 ab	18.74	172
City of 2,501–25,000	43.97 b	9.34	283	38.30 cd	7.74	284	76.36 b	17.97	282
City of 25,001–50,000	43.79 b	9.12	136	36.32 a	7.61	137	72.48 ab	17.36	136
City of 50,001–100,000	48.87 c	8.06	90	39.49 d	7.32	90	85.26 c	16.49	87
City of over 100,000	49.80 c	8.43	105	37.09 abc	7.01	106	85.21 c	19.55	106
F-Ratio	**21.31*****			**2.96***			**13.08*****		
(Error degrees of freedom)	**(1,067)**			**(1,075)**			**(1,059)**		
Age:									
20–40 years	44.77 b	9.12	127	37.69 a	7.44	126	78.00 b	17.91	128
41–50 years	45.44 b	9.98	337	38.19 a	8.04	343	78.61 b	20.01	338
51–60 years	44.34 b	9.98	337	37.60 a	7.95	336	76.28 b	18.86	334
61 years and older	40.92 a	9.29	271	37.21 a	7.63	274	71.88 a	19.53	264
F-Ratio	**11.89*****			**0.83**NS			**6.53*****		
(Error degrees of freedom)	**(1,068)**			**(1,075)**			**(1,060)**		
Education:									
No college degree	42.08 a	8.86	368	38.34 b	7.88	372	72.64 a	18.48	367
Completed college	42.03 a	10.08	225	35.97 a	7.97	227	72.71 a	19.18	223
Some graduate education	46.13 b	10.51	160	37.95 b	8.03	162	79.00 b	20.07	159
Graduate degree	45.90 b	9.99	324	38.02 b	7.54	324	80.62 b	19.58	321
F-Ratio	**14.43*****			**4.78****			**13.41*****		
(Error degrees of freedom)	**(1,073)**			**(1,081)**			**(1,066)**		

Table 11. Mean attitudinal indicator scores, standard deviations and ANOVA F-ratios for main effects (continued).†

	Agricultural Pollution			Environmentalism			Government Confidence		
	Mean	SD	n††	Mean	SD	N	Mean	SD	n
Ethnicity:									
Anglo	44.17 b	10.31	727	36.66 a	7.56	728	75.13 b	19.90	714
Hispanic	43.70 b	7.82	241	40.05 b	6.95	245	80.39 c	16.17	243
Native American	45.44 b	7.19	39	45.32 c	5.65	40	83.90 c	13.33	40
Other	38.84 a	11.77	48	36.65 a	9.76	48	67.19 a	22.82	49
F-Ratio	**4.82****			**26.87*****			**10.50****		
(Error degrees of freedom)	**(1,051)**			**(1,057)**			**(1,042)**		
Gender:									
Male	43.66 a	9.92	787	37.11 a	7.77	793	74.99 a	19.50	781
Female	44.58 a	9.64	282	39.39 b	7.75	283	79.59 b	18.81	280
F-Ratio	**1.82**NS			**17.92*****			**11.67*****		
(Error degrees of freedom)	**(1,067)**			**(1,074)**			**(1,059)**		
Income:									
≤ $40,000 per year	41.54 a	9.33	207	39.20 c	8.33	206	75.21 ab	19.51	202
$41,000–$60,000	45.43 b	9.96	253	39.07 c	8.18	255	78.65 b	19.77	252
$61,000–$80,000	44.46 b	9.98	217	37.95 bc	7.20	218	78.69 b	20.33	215
$81,000–$100,000	45.44 b	9.60	154	36.74 ab	7.26	155	77.15 ab	17.47	154
> $100,000 per year	43.99 b	9.06	174	35.40 a	6.91	175	73.29 a	17.34	175
F-Ratio	**5.68*****			**8.54*****			**2.95***		
(Error degrees of freedom)	**(1,000)**			**(1,004)**			**(993)**		

Table 11. Mean attitudinal indicator scores, standard deviations and ANOVA F-ratios for main effects (continued).†

	Agricultural Pollution			Environmentalism			Government Confidence		
	Mean	**SD**	**n††**	**Mean**	**SD**	**N**	**Mean**	**SD**	**n**
Timber Industry:									
No	43.92 b	9.66	986	37.64 a	7.79	993	76.09 a	19.06	979
Yes	41.23 a	12.91	64	38.11 a	8.43	64	73.13 a	25.30	63
F-Ratio	**4.45***			**0.22^{NS}**			**1.36^{NS}**		
(Error degrees of freedom)	**(1,048)**			**(1,055)**			**(1,040)**		
Livestock Industry:									
No	45.81 b	9.05	786	38.27 b	9.65	794	78.71 b	18.58	783
Yes	37.62 a	9.79	264	35.86 a	8.07	263	67.44 a	19.77	259
F-Ratio	**155.39*****			**19.13*****			**69.27*****		
(Error degrees of freedom)	**(1,048 df)**			**(1,055 df)**			**(1,040 df)**		
Crop Production Industry:									
No	45.05 b	9.56	825	37.90 a	7.67	833	77.40 b	19.06	821
Yes	39.00 a	9.66	225	36.82 a	8.33	224	70.39 a	20.12	221
F-Ratio	**70.44*****			**3.39^{NS}**			**22.98*****		
(Error degrees of freedom)	**(1,048 df)**			**(1,055 df)**			**(1,040 df)**		

† = Means with the same letter in the same column for each sociodemographic factor are not significantly different at $p < 0.05$.
†† = n varies because some respondents did not answer all questions included in the three scale indicators.
*** = Significant at $p < 0.001$
** = Significant at $p < 0.01$
* = Significant at $p < 0.05$
NS = Not statistically significant

Due to the small number of respondents who characterized themselves as either African-American or Asian-American, these responses were grouped with "Other" respondents, leaving a total of four ethnic groups (including Anglo, Hispanic and Native American). There were no notable differences in *Agricultural Pollution* means, except for the significantly lower mean response for the "Other" ethnicity group. Native Americans and Hispanics tended to have stronger *Government Confidence* attitudes, relative to Anglos and "Other" respondents. *Environmentalism* means were significantly higher for Native Americans and Hispanics.

Female respondents registered more positive in their assessment of government's role in managing the environment and also in their *Environmentalism* leanings. However, there was no gender difference found for the *Agricultural Pollution* indicator.

Higher income respondents had a significantly lower mean Environmentalism score, while the mean value for *Agricultural Pollution* was significantly lower for respondents in the less than $40,000 annual household income group than means for any higher income group. *Government Confidence* scores did not differ significantly between respondents at either extreme of the household income spectrum. However, respondents with midlevel incomes had significantly higher *Government Confidence* scores than those in the highest income category.

Respondents with no closeness to or involvement with the timber industry had a higher mean *Agricultural Pollution* score. However, attitudes as summarized in *Government Confidence* and *Environmentalism* were not significantly different between the two respondent groups. Respondents with no livestock industry involvement have more confidence in government, a stronger belief that agricultural pollution is a problem and a higher mean score for *Environmentalism*. Respondents who reported involvement with crop production activities had significantly lower *Government Confidence* and *Agricultural Pollution* mean scores, but their *Environmentalism* score was not significantly different.

In an attempt to consider more complex relationships, a seven-factor analysis of variance examining the main effects and limited interaction effects of the sociodemographic variables on each of the scale indicators was conducted. Because there were few respondents from the Native American or "Other" ethnic groups, this analysis only used data for Anglo and Hispanic respondents. Backward elimination was used to select a regression model that incorporated all seven sets of main effects as well as selected two-way interaction effects. An iteration of the elimination procedure consisted of removing the interaction effect that has the largest p-value from the model and continued until all interactions remaining in the model had p-values below 0.15. The seven sociodemographic variables included in the models were place of residence, gender, ethnicity, age, income, education and farm/ranch involvement. The farm/ranch variable combined information from the livestock and crop production industry involvement items. The new variable was set to "yes" if the response to either of these items was "yes" and to "no" if the response to both was "no."

Table 12 summarizes the final regression models for the three dependent variables. The final model for *Agricultural Pollution* includes five sets of interaction effects (48 df) and explains 28% of the variability observed in *Agricultural Pollution* scores. P-values reported are based on Type II sums of squares.

Results for the simple associations reported in table 11 for *Agricultural Pollution* are consistent with the results presented in table 12. For example, gender main effects are not significant. And while the final model includes the gender*ethnicity interaction, it is not statistically significant (p = 0.07). Consistent with the analysis of simple associations, the main effects of place of residence, age, income, education and farm/ranch involvement are significant. However, in the presence of significant interactions, interpretation and discussion will focus on the interaction least squares means.

Table 13 shows the least squares means and the results of the *post hoc* least significant difference tests corresponding to the significant interaction effects for each attitudinal scale. While the farm/ranch main effect suggests an overall tendency for people associated with agriculture to have lower *Agricultural Pollution* scores, the tendency is not the same across all places. For rural places, towns and small cities, people involved in agriculture have significantly lower mean scores than those not in agriculture. However, for the more urbanized areas, the difference between respondents involved in agriculture and those not in agriculture is not significant. Also, while not a significant difference, the mean for large city nonfarmers is actually lower than the mean for large city residents who are associated with agriculture.

Table 12. Summary of final regression models (Anglos and Hispanics only).

		p-values		
Effect	**df**	**Agricultural Pollution**	**Environmentalism**	**Government Confidence**
Place of Residence	5	<0.0001	0.0175	<0.0001
Gender	1	0.7417	<0.0001	0.0014
Ethnicity	1	0.7422	<0.0001	<0.0001
Age	3	0.0001	0.3514	0.2678
Income	4	0.0005	0.0051	0.0033
Education	3	<0.0001	0.0412	<0.0001
Farm/Ranch	1	<0.0001	0.0025	<0.0001
Place of Residence * Gender	5	—	—	—
Place of Residence * Ethnicity	5	—	0.0231	0.0002
Place of Residence * Age	15	—	—	—
Place of Residence * Income	20	0.1262	0.1345	0.0079
Place of Residence * Education	15	—	—	—
Place of Residence * Farm/Ranch	5	0.0123	—	0.0140
Gender * Ethnicity	1	0.0706	—	—
Gender * Age	3	—	0.0402	0.0156
Gender * Income	4	—	—	—
Gender * Education	3	—	0.1463	—
Gender * Farm/Ranch	1	—	—	—
Ethnicity * Age	3	—	0.0745	0.0532
Ethnicity * Income	4	—	—	0.1296
Ethnicity * Education	3	0.0482	—	0.0073
Ethnicity * Farm/Ranch	1	0.1189	—	—
Age * Income	12	—	—	—
Age * Education	9	—	—	—
Age * Farm/Ranch	3	—	—	—
Income * Education	12	—	0.0348	—
Income * Farm/Ranch	4	—	—	—
Education * Farm/Ranch	3	—	—	—
R^2		0.28	0.22	0.28
Adjusted R^2		0.24	0.16	0.23

The *F*-test suggests that some ethnicity*education differences exist in *Agricultural Pollution* scores, and *post hoc* analysis reveals that ethnicity differences do exist at the lowest educational level. The mean for Anglos having the least education is significantly lower than the mean for the least-educated Hispanics. Ethnicity differences are not significant for any of the three higher education groups. Some of the other significant differences are consistent with the education simple associations noted earlier. In particular, the mean for Anglos with graduate degrees is significantly higher than the means for either of the lowest two educational groups. This pattern is not shared by Hispanics whose mean at the lowest education level does not differ significantly from the means at either of the two higher education levels.

The final model for *Environmentalism* includes six sets of interactions (64 df) and explains 22% of the variability observed in the *Environmentalism* scores. Only the farm/ranch variable is not involved in a significant (or even an included) interaction. The *Environmentalism* mean for those not involved in agriculture is significantly higher than the mean for those involved in agriculture (39.63 versus 37.92). The significant interactions were place*ethnicity, gender*age and income*education. For rural places, towns and the two smaller city groups, the mean for Anglos is significantly lower than that of Hispanics. Means for Anglos and Hispanics in the larger cities do not differ significantly.

The mean for Anglos in rural areas is significantly lower than the means for Anglos in most of the more urbanized places. The mean for Anglos in cities with populations between 50,001 and 100,000 also is significantly higher than the mean for Anglos in either small or medium cities. No Hispanic means differ significantly.

While the *Environmentalism* means for gender*age reflect the overall tendency of females to have higher scores than males, the mean for males 40 years of age and younger does not differ significantly from the mean for females 40 and under. The same is true for males and females who are 61 and older. However, means for females are significantly higher than for males in both the 41-50 and 51-60 age groups. Interestingly, 41-50 year old males have a significantly lower mean than either 51-60 year old males or over 61 males. Females aged 41-50 do not differ significantly from females 51-60 or over 61.

Table 13. Least squares mean attitudinal scale scores for significant interactions (Anglos/Hispanics only).†

Effect	Agricultural Pollution	Environ-mentalism	Government Confidence
Place of Residence * Ethnicity			
Rural * Anglo		35.10 a	69.09 a
Rural * Hispanic		40.10 cd	84.54 cd
Town of 2,500 or less * Anglo		37.69 bc	72.39 ab
Town of 2,500 or less * Hispanic		41.58 d	85.78 cd
City of 2,501–25,000 * Anglo		36.85 b	74.74 b
City of 2,501–25,000 * Hispanic		41.15 d	82.18 c
City of 25,001–50,000 * Anglo		35.67 ab	73.21 ab
City of 25,001–50,000 * Hispanic		41.81 de	85.43 cd
City of 50,001–100,000 * Anglo		40.00 cd	84.30 cd
City of 50,001–100,000 * Hispanic		38.26 abcd	78.03 abc
City of over 100,000 * Anglo		37.93 bce	92.67 d
City of over 100,000 * Hispanic		39.15 bcd	89.47 cd
Place of Residence * Income			
Rural * ≤ $40,000			71.90 a
Rural * $41,000-$60,000			76.59 ab
Rural * $61,000-$80,000			81.70 be
Rural * $81,000–$100,000			77.27 ab
Rural * > $100,000			76.62 ab
Town of 2,500 or less * ≤ $40,000			79.62 be
Town of 2,500 or less * $41,000–$60,000			80.70 be
Town of 2,500 or less * $61,000–$80,000			77.62 abe
Town of 2,500 or less * $81,000–$100,000			73.87 ab
Town of 2,500 or less * > $100,000			83.61 abd
City of 2,501–25,000 * ≤ $40,000			81.40 be
City of 2,501–25,000 * $41,000–$60,000			79.86 be
City of 2,501–25,000 * $61,000–$80,000			72.27 a
City of 2,501–25,000 * $81,000–$100,000			82.95 be
City of 2,501–25,000 * > $100,000			75.83 ab
City of 25,001–50,000 * ≤ $40,000			82.68 abd
City of 25,001–50,000 * $41,000–$60,000			78.62 abe
City of 25,001–50,000 * $61,000–$80,000			79.10 abe
City of 25,001–50,000 * $81,000–$100,000			80.29 abe
City of 25,001–100,000 * > $100,000			75.93 ab
City of 50,001–100,000 * ≤ $40,000			86.18 bc
City of 50,001–100,000 * $41,000–$60,000			84.03 bd
City of 50,001–100,000 * $61,000–$80,000			81.10 abe
City of 50,001–100,000 * $81,000–$100,000			75.40 abe
City of 50,001–100,000 * > $100,000			79.11 abe

Table 13. Least squares mean attitudinal scale scores for significant interactions (Anglos/Hispanics only) (continued).†

Effect	Agricultural Pollution	Environ-mentalism	Government Confidence
Place of Residence * Income			
City of over 100,000 * ≤ $40,000			88.60 abc
City of over 100,000 * $41,000–$60,000			98.91 cd
City of over 100,000 * $61,000–$80,000			98.85 c
City of over 100,000 * $81,000–$100,000			89.74 cde
City of over 100,000 * > $100,000			79.23 ab
Place of Residence * Farm/Ranch			
Rural * No	45.00 b		82.29 cde
Rural * Yes	37.68 a		71.34 a
Town of 2,500 or less * No	46.59 bc		83.98 de
Town of 2,500 or less * Yes	39.25 a		74.19 ab
City of 2,501–25,000 * No	45.03 b		80.33 bcd
City of 2,501–25,000 * Yes	40.17 a		76.59 abc
City of 25,001–50,000 * No	44.58 b		79.03 bcd
City of 25,001–50,000 * Yes	44.51 b		79.62 abcd
City of 50,001–100,000 * No	49.09 cd		85.63 de
City of 50,001–100,000 * Yes	42.54 abc		76.69 abcd
City of over 100,000 * No	49.83 d		86.38 de
City of over 100,000 * Yes	50.55 bcd		95.75 e
Gender * Age			
Male * ≤ 40 years		37.21 ab	79.17 ab
Male * 41–50 years		36.68 a	76.88 a
Male * 51–60 years		38.36 b	80.95 b
Male * 61 years or older		38.65 bc	78.99 ab
Female * ≤40 years		37.84 abc	82.89 abc
Female * 41–50 years		41.36 d	87.37 c
Female * 51-60 years		40.66 cd	83.53 bc
Female * 61 years or older		39.44 bcd	78.10 ab
Ethnicity * Education			
Anglo * Less than college degree	43.19 ab		75.01 a
Anglo * College degree	42.05 a		75.23 a
Anglo * Some graduate education	45.35 bc		78.89 ab
Anglo * Graduate degree	45.94 c		81.81 b
Hispanic * Less than college degree	45.93 c		79.78 ab
Hispanic * College degree	42.18 ab		78.70 ab
Hispanic * Some graduate education	47.77 c		96.11 c
Hispanic * Graduate degree	44.14 abc		82.37 b

Table 13. Least squares mean attitudinal scale scores for significant interactions (Anglos/Hispanics only) (continued).†

Effect	Agricultural Pollution	Environ-mentalism	Government Confidence
Income * Education			
≤ $40,000 * Less than college degree		39.85 bcd	
≤ $40,000 * College degree		37.17 abcd	
≤ $40,000 * Some graduate education		46.04 f	
≤ $40,000 * Graduate degree		38.22 abcd	
$41,000–$60,000 * Less than college degree		39.12 bcd	
$41,000–$60,000 * College degree		40.25 cd	
$41,000–$60,000 * Some graduate education		41.02 de	
$41,000–$60,000 * Graduate degree		40.88 d	
$61,000–$80,000 * Less than college degree		37.73 abce	
$61,000–$80,000 * College degree		38.34 abcd	
$61,000–$80,000 * Some graduate education		38.46 abcd	
$61,000–$80,000 * Graduate degree		39.64 bcd	
$81,000–$100,000 * Less than college degree		37.66 abcd	
$81,000–$100,000 * College degree		38.17 abcd	
$81,000–$100,000 * Some graduate education		36.10 ab	
$81,000–$100,000 * Graduate degree		37.90 abce	
> $100,000 * Less than college degree		38.26 abcd	
> $100,000 * College degree		36.73 ab	
> $100,000 * Some graduate education		35.31 a	
> $100,000 * Graduate degree		38.65 abcd	

†= Means with the same letter in the same column for each sociodemographic effect are not significantly different at $p < 0.05$.

While overall *Environmentalism* scores tend to be lower for those having higher household incomes, this pattern is difficult to discern based on the 20 means corresponding to combinations of education and income. Comparing income levels for respondents at the lowest education level does not reveal any significant differences. However for respondents holding a college degree, those earning $40,000–$60,000 have a significantly higher mean than those earning at least $100,000. Individuals earning less than $40,000 and with some graduate education have a significantly higher mean than any other group defined by income and education level. Additional differences among those with some graduate education are that those earning $40,000–$60,000 have a significantly higher mean than those earning either $80,000–$100,000 or greater than $100,000. For people with graduate degrees, those earning \$40,000–\$60,000 have a significantly higher mean than those earning \$80,000–\$100,000.

The final model for *Government Confidence* includes seven sets of interactions (61 df) and explains 28% of the variability in *Government Confidence* scores. Significant interactions were found for place*ethnicity, place*income, place*farm/ranch, gender*age and ethnicity*education. Differences between *Government Confidence* means for place*ethnicity exhibit a similar pattern to that observed for *Environmentalism* means. That is, for the rural areas, small towns and the two smaller city sizes, the mean for Anglos is significantly lower than the mean for Hispanics. For Anglos, the means tend to increase with degree of urbanization. None of the means for Hispanics differs significantly.

While the *Government Confidence* means for place of residence and income reflect the overall tendency for the scores to increase with increasing place population, patterns by income level are not consistent across places of residence. For rural areas, the only significant difference is between the lowest income group and those with household incomes in the \$60,000–\$80,000 category. Those in the lowest income category report a lower mean *Government Confidence* score. This is nearly the opposite of what is observed for the smaller cities where the mean for those in the \$60,000–\$80,000 range is significantly lower than the mean for those in the lowest two income categories as well as those in the \$80,000–\$100,000 category. For the largest city size category, the mean corresponding to the highest income category is significantly lower than the means for the three middle-income categories. While the pattern of significance is markedly affected by the sample sizes, it is interesting to note that the mean for those from rural areas and the lowest income category and those in the largest city group and the highest income category do not differ significantly. For those earning \$40,000–\$60,000, the mean of those living in a city of more than 100,000 is significantly higher than that for any other place. This also is true for those in the \$60,000–\$80,000 bracket. However, for this group, those in small cities have a significantly lower mean than do those in rural areas.

Government Confidence means by place of residence and farm/ranch association provide more insight into the simple associations. In rural areas and towns, the *Government Confidence* mean for

those not involved in agriculture is significantly higher than for those close to the industry. Differences between the two groups were not significant for other types of places. There also weren't any significant differences among place of residence means for those not involved in agriculture. However, for those who are involved in agriculture, the mean for the largest city size is significantly higher than for any of the other places.

Government Confidence means by gender and age are consistent with the simple associations in that, by age category, means for females tend to be greater than means for males. However, the only significant difference between males and females was found for the 41–50 year olds category. For males, the only significant difference across the age groups is between the 41–50 year olds and the 51–60 year olds (76.88 versus 80.95), while for females, the only significant difference is between the 41–50 year olds and the 61+ year olds (87.37 versus 78.10). It is interesting to note that male and female means are quite similar for the 61+ category.

Government Confidence means for ethnicity*education are somewhat reflective of trends observed in the simple associations. For Anglos, the mean for those with graduate degrees is significantly higher than the means for either those with less than a college degree and for those with a college degree. For Hispanics, the mean for people with some graduate work is significantly higher than the means for any of the other three educational groups. A comparison of Anglos to Hispanics for each educational group reveals only one statistically significant difference. The mean for Hispanics with some graduate work is higher than the mean for Anglos with some graduate work.

All three final models were checked for degradation of estimates due to multicollinearity. Collinearity diagnostics did not yield a condition index exceeding 30 (Belsley, Kuh and Welsch, 1980). While this is the index magnitude associated with problematic collinearity, estimates can degrade at lower index values. In fact, for the final *Agricultural Pollution* model, there were two fairly large condition indices (23 and nearly 17), which confirm associations among the independent variables. In particular, there is an association between income level and place of residence with incomes tending to be higher in larger cities. The two largest condition indices for the final *Environmentalism* model chosen were nearly 27 and 21. As with *Agri-*

cultural Pollution, these arise largely from associations between place of residence and income, however the diagnostics also implicate education in the partial collinearities. Again cross-tabulations confirm associations among place of residence, income and education. Little additional insight is provided by the diagnostics for the final *Government Confidence* model.

CLUSTER ANALYSIS

The survey respondents' three attitude scale scores were subjected to cluster analysis to further summarize attitude types. Cluster analysis is a statistical procedure that identifies natural clusters within a mix of observations (Lorr, 1983). Cluster analysis procedures involve searching the data for a structure of natural groupings (Johnson and Wichern, 1992). According to Lorr (1983), the groupings or clusters represent several distinguishable populations.

The cluster analysis identified three distinct groupings of individuals based on their attitudes toward the environment, agriculture and government. The means and standard deviations (SDs) of the three attitude variables by cluster groups are shown in table 14, along with the descriptive names assigned to each cluster.

As was expected, there was very strong clustering at both ends of the attitude scales. The cluster with the highest scores for all three indicator scales was named *Deep Green*. These individuals have strong environmentalist leanings, believe that the costs or trade-offs resulting from environmental regulation are worth incurring, that environmental problems are a threat, and that government should have an active role in dealing with them. They also tend to have relatively negative attitudes toward agriculture and its impact on the natural environment.

The cluster of respondents with the lowest scores for all three scales was named the *Environmental Skeptics*. These people tend to have positive attitudes toward production agriculture, are concerned about the costs of environmental regulations, are worried about government expansion through environmental policies, and have less concern about the natural environment's current condition. *Middle Road* individuals did not respond strongly to either end of the attitude questions and have scores that reflect this tendency.

Table 14. Cluster analysis results.

	Agricultural Pollution Mean score (SD)	Environmentalism Mean score (SD)	Government Confidence Mean score (SD)
Cluster Number/Name:			
1/"Environmental Skeptics"	31.3 (7.4)	29.6 (6.5)	47.8 (8.3)
2/"Middle Road"	44.1 (6.2)	38.0 (6.4)	75.9 (9.6)
3/"Deep Green"	54.7 (6.6)	44.2 (6.0)	102.2 (8.3)
Scale Indicator Ranges:	15–75	13–65	27–135

Table 15 shows the percentages of individuals in each cluster group for several attribute categories. P-values are reported for χ^2 tests of differences among proportions within each attribute category (Hoshmand, 1988). Gender was the only respondent attribute for which the null hypothesis of no significant differences between percentages could not be rejected.

The highest percentage of *Deep Green* respondents was found in the north-central urban region (i.e., Albuquerque). The north-central rural region is dominated by *Middle Road* respondents, while rural counties tend to contain the highest percentages of *Environmental Skeptics*.

Rural areas, towns and cities with fewer than 50,000 residents were observed to have fewer than 20% of respondents classified as *Deep Green*. However, cities with populations greater than 50,000 were observed to have nearly 40% *Deep Green* respondents. Consequently, the distribution of *Environmental Skeptics* follows a reverse pattern across places of residence, with their numbers concentrated in rural areas. No respondents in the youngest age category were classified as *Environmental Skeptics*, and almost a third of the respondents with the highest level of educational attainment are in the *Deep Green* cluster.

A smaller percentage of Anglos is in the *Middle Road* cluster relative to other ethnic groups (57.6% versus 69.1% of Hispanics and 72.5% of Native Americans), and much smaller percentages of Hispanics or Native Americans were in the *Environmental Skeptics* cluster. As expected, distribution into the three clusters differs between political orientation categories, with small percentages of conservatives in the *Deep Green* cluster (6-9%), larger percentages of conservatives in the *Environmental Skeptics* cluster (>25%), and more than two-thirds of the self-labeled moderates falling into the *Middle Road* cluster. People who identified themselves as liberals were much more likely to be in the *Deep Green* cluster (45-74%).

More than 50% of respondents who reported they were involved in or had some closeness to the livestock industry are in the *Middle Road* cluster, while 10% are in the *Deep Green* cluster, and 38% in the *Environmental Skeptics* cluster. People not involved in the livestock industry were more likely to be in the *Deep Green* cluster. Respondents who reported some closeness to or involvement with crop production activities were distributed similarly across the three attitude clusters, although the percentage of *Environmental Skeptics* was smaller and the percentage in the *Deep Green* cluster was larger.

SUMMARY AND CONCLUSION

The simple frequency analysis of the data found a great diversity of attitudes among the respondents. However, one particular theme stands out from the raw frequency results. Almost 94% of the respondents expressed agreement or strong agreement with the statement that the public needs to be educated about the costs of environmental regulations. More than 70% disagreed or strongly disagreed that the public in New Mexico has a good understanding of the state's water issues and almost 70% agreed or strongly agreed that public education campaigns would increase the public's acceptance of water regulations. The survey results lead toward the conclusion that there are unmet informational needs in New Mexico related to water and environmental issues.

The ANOVA results presented previously summarize mean differences in attitudes toward agriculture, the natural environment and government associated with differences in sociodemographic characteristics. For example, women tend to have beliefs more consistent with NEP and have more faith in government's ability to deal with environmental problems. The results also indicate that NEP-type attitudes are relatively widespread across people of all age groups, although less strong for the oldest group. While people who consider themselves to be closely associated with farming or ranching tend to see production agriculture in a sympathetic light, this tendency diminishes for individuals living in more urbanized

Table 15. Percentage of respondents in each cluster group by attribute category and total respondents in each attribute category.

Respondent Attributes	Deep Green %	Middle Road %	Environmental Skeptics %	Total Respondents #
Regional group:				
Northwest rural	19.4	67.0	13.6	103
North-central rural	20.5	71.8	7.7	78
North-central urban	34.7	57.7	7.7	274
Northeast rural	20.4	51.5	28.2	103
Southwest rural	16.5	54.4	29.1	158
Southwest urban	28.6	63.3	8.2	49
Southeast rural	10.9	60.9	28.2	330
		$P < .0001$		
Place of residence:				
Rural area	16.2	53.9	29.9	291
Town of 2,500 or less	17.7	59.4	22.9	175
City of 2,501–25,000	17.9	65.6	16.5	285
City of 25,001–50,000	14.6	66.4	19.0	137
City of 50,001–100,000	38.9	56.7	4.4	90
City of greater tthan100,000	40.2	52.3	7.5	107
		$P < .0001$		
Age:				
20–30 years	37.0	63.0	0.0	27
31–40 years	19.8	62.4	17.8	101
41–50 years	26.2	57.6	16.3	344
51–60 years	20.4	60.4	19.2	338
61–70 years	14.2	60.5	25.3	190
71 years or older	14.3	59.5	26.2	84
		$P = .0028$		
Educational Attainment:				
No high school diploma	12.5	75.0	12.5	8
Completed high school	8.4	66.4	25.2	107
Some college	13.9	65.6	20.5	259
Completed college	12.3	64.0	23.7	228
Some graduate education	29.5	54.0	16.6	163
Graduate degree	32.9	51.4	15.7	325
		$P < .0001$		

Table 15. Percentage of respondents in each cluster group by attribute category and total respondents in each attribute category.

Respondent Attributes	Deep Green %	Middle Road %	Environmental Skeptics %	Total Respondents #
Gender:				
Male	19.4	59.6	21.0	795
Female	25.9	59.8	14.3	286
		P = 0.1070		
Ethnicity:				
Anglo	20.9	57.6	21.5	731
Hispanic	21.5	69.1	9.4	246
Native American	25.0	72.5	2.5	40
Other	14.3	44.9	40.8	49
		P < .0001		
Income:				
< $20,000 per year	15.2	67.4	17.4	46
$20,000–$40,000 per year	16.1	59.3	24.7	162
$41,000–$60,000 per year	28.1	57.8	14.1	256
$61,000–$80,000 per year	25.2	56.0	18.8	218
$81,000–$100,000 per year	20.5	64.1	15.4	156
> $100,000 per year	15.3	64.8	19.9	176
		P = .0135		
Political Orientation:				
Very liberal	73.7	15.8	10.5	19
Liberal	69.1	29.4	1.5	68
Liberal–moderate	45.4	47.5	7.1	141
Moderate	21.0	69.4	9.6	291
Conservative–moderate	7.6	67.0	25.4	291
Conservative	6.2	66.8	26.9	193
Very conservative	8.8	34.2	57.0	79
		P < .0001		
Livestock Industry:				
Yes	9.8	52.1	38.1	265
No	24.2	62.5	13.3	797
		P < .0001		
Crop Production Industry:				
Yes	14.2	57.3	28.4	225
No	22.7	60.3	17.1	873
		P = .0001		

areas. Hispanics are more confident in government. However, this tendency was not found for residents of the state's most urbanized area or, for the most part, when controlling for educational attainment.

As is common in observational socioeconomic investigations, the data were unbalanced and there exist large person-to-person differences that are not explained. Less than 30% of variability in attitude scores was accounted for by the socio-demographic variables. The ANOVA was able to assess mean differences by groups, but unobserved underlying factors exist and may confound the results. For example, it was noted that older people were significantly more sympathetic to agriculture than other age groups. However, it is impossible to assess whether this represents an age trend or a secular trend. For example, do older people have more sympathy for agriculture due to their own origins, or do attitudes toward agriculture soften with age? Simple associations between sociodemographic and response variables thus may reflect other variables (observed or unobserved), and direct cause and effect conclusions cannot be implied.

Results of the cluster analysis reflect the polarization over natural resource issues New Mexico has experienced in recent years. Conflicts have increased as traditional paradigms or ways of looking at agriculture, the environment and natural resources have been confronted with an alternative set of beliefs and values. New stakeholders have entered the policy debate and traditional, natural resource-based industries have been threatened. Roughly equal numbers of New Mexico survey respondents fell into the two attitude clusters typically at loggerheads in local or statewide environmental issues. However, 60% of the respondents did not express opinions at either extreme about the environment, agriculture and government.

Communities, agencies, educators, nonprofit groups and the private sector have sought ways to improve communication among stakeholders and enhance the public input process with respect to environmental policymaking, regulation and natural resource management (Pelstring, 1997). Understanding attitudes about the environment, agriculture and government and having knowledge of associations between attitudes and sociodemographic variables can help communication facilitators anticipate likely differences between stakeholders. This information will help facilitators better plan and prepare. It also will contribute to improved communication among the many people involved in natural resource issues or conflicts. Recognizing that differences exist among people with varying backgrounds is the first step in appreciating and understanding the origins of diverse attitudes. Future investigation to shed light on the personal experiences, histories or backgrounds that lead to attitude differences would also contribute to more constructive natural resource debates. For instance, are attitudes toward the natural environment products of actual experiences or are they developed vicariously? If they arise vicariously, what are the influencing factors? If they are primarily experiential, what situations create them?

The study's objective was to provide previously unavailable insight into New Mexicans' attitudes toward the environment, agriculture and government. An important study output was an attitude assessment tool that can be applied in other settings, with other populations and over time. Future use of the survey instrument or selected questionnaire items will further identify competing attitudes that may be at the root of environmental conflicts in New Mexico.

If lead time were available, people expected to be involved in environmental assessment, policymaking, regulatory or management processes could be asked in advance by relevant groups or agencies to answer the survey items included in the attitude scales. The data could be compiled in a very simple manner using spreadsheet software and used to inform all participating parties of the range of beliefs and attitudes that must be incorporated into natural resource policymaking, planning, regulation and management. Appendix D presents a spreadsheet program where an individual can respond to the survey items included in the *Agricultural Pollution*, *Environmentalism* and *Government Confidence* scale indicators. After responses are entered into the worksheet, scale indicator scores are calculated automatically and information about attitude types is provided.

Population growth, economic development and diversification and future competition for resources mean that environmental conflicts will continue to emerge throughout New Mexico. Greater understanding of New Mexicans' attitudes toward the environment, agriculture and government can contribute to better communication and enhanced mutual respect among those involved in environmental and natural resource issues in this state and elsewhere.

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APPENDIX A: LITERATURE REVIEW

ENVIRONMENTAL ATTITUDES

Constantini and Hanf (1972) published one of the earliest studies assessing environmental attitudes. The researchers gathered survey data in 1970 from individuals living in the Lake Tahoe Basin. Their objective was to identify the kinds of constraints within which environmental problem-solving occurs. They used Likert-type items on their questionnaire and developed Environmental Concern, Environmental Utility and Environmental Action scales. Their survey population consisted of a community leadership group and included mostly middle class individuals. They found that people with a relatively high level of environmental concern were better educated, had lower incomes, were less likely to be permanent Basin residents, were likely to hold liberal political views and tended to be critical of technology's impact on society.

Lounsbury and Tornatzky (1977) examined attitudes toward environmental quality in three studies of college undergraduates, adult citizens, housewives and members of environmental groups. They developed a three-dimensional scale that included concerns for environmental action, environmental degradation and overpopulation. They used a questionnaire with Likert scales and applied cluster analysis to the responses. Their examination of attitude-behavior relationships found several correlations between concerns about overpopulation and actual respondent family size.

Current literature (at the time) dealing with measurements of environmental concern was reviewed by Buttel and Johnson in 1977. They also reported the results of attitudinal and policy-related interview questions that were administered to a sample of Wisconsin elites. They applied factor analysis to the survey results and found many dimensions to environmental attitudes. Their results indicated that people who live in low socioeconomic status communities, and those who are engaged in commercial-industrial enterprises are unlikely to be supporters of environmental initiatives that threaten industrial polluters. Education was correlated positively with the desire for activist environmental policies. The authors also noted that the education result coincided with a tendency for well-educated professionals to be in government employment.

In the mid-1970s, Weigel and Weigel (1978) surveyed random samples of residents of New England towns and cities and used the responses to develop an Environmental Concern Scale. The researchers did follow-up interviewing of the respondents and asked them the same questions a second time in order to test the stability of responses. They also collected data for a sample that consisted only of Sierra Club members. Not surprisingly, the results for the Sierra Club members were significantly higher than the broad citizen sample. A high correlation also was found between reported behavior and concern for the environment (i.e., recycling, litter pickup).

Dunlap and Van Liere (1978) tested the strength of what has been called the "New Environmental Paradigm," or NEP. NEP, which emerged in the 1970s, was in direct contrast to the Dominant Social Paradigm (DSP) of the time, which included a belief in abundance and progress, devotion to growth and prosperity, faith in science and technology, commitment to a laissez-faire economy, limited government planning, and strong property rights. The DSP was blamed widely by many observers to have been a major contributor to environmental degradation and a hindrance to efforts to improve the environment. The emerging NEP emphasized "limits to growth," the "steady-state" economy, the "balance of nature" and rejection of anthropocentrism.

Dunlap and Van Liere (1978) measured the New Environmental Paradigm using a sample of Washington state residents (drawn from telephone directories) and Likert-type questions. The authors found a high degree of acceptance of NEP, among both environmentalists and the general public. The positive response of the general public to NEP was much greater than the authors expected.

Dunlap and Van Liere (1984) found that the traditional values and beliefs of DSP continued to be important sources of opposition to environmental protection. But their later research also found that many people endorsed both DSP and supported environmental protection efforts. Thus, they concluded that it would be naïve to expect DSP to be completely superceded by NEP, due to DSP's founding in traditional values and beliefs.

Belief systems related to the environment among the general public, several involved groups and Idaho state legislators were examined by Pierce and Lovrich (1980). Data were obtained through a mail survey as part of a larger study of Idaho water resource allocation policy development. The researchers found a strong connection between environmental preservation beliefs and strong trust in information sources.

The paradigm shift between DSP and NEP was also investigated by Albrecht et al. (1982). These authors sought to examine people's more generic environmental dispositions, rather than their responses to specific issues (e.g., overpopulation, soil erosion, air pollution). Questionnaires were sent to two populations in Iowa–farm operators and city residents. The authors found that acceptance of NEP was surprisingly high for both the farm and urban respondents. Van Liere and Dunlap (1981) continued to examine environmental concern measures. They again found that liberal political ideology and greater education are the strongest and most consistent positive correlates of environmental concern. Women also tended to be significantly more environmentally concerned than men, while age generally was negatively related to environmental concern.

Mohai (1985) investigated the common belief that environmental values are predominantly upper-middle class values. He obtained data from a 1979 national stratified sample survey sponsored by the U.S. Soil Conservation Service. Factor analysis was applied to the data, which had been generated through personal interviews. The factor analysis produced several subgroups of items used to measure environmental concern. Results indicated that upper-middle class environmental activism was primarily the result of that class's greater access to resources and greater sense of personal effectiveness. The author concluded that the link between the upper-middle class and environmental activism really is a link between socioeconomic status and political activism factors, rather than a link between the upper-middle class and environmental concern.

Increased concern about ecological problems in Europe was the subject of a study by Rohrschneider (1988). The author analyzed information from five European countries where Green parties were having a growing influence in national politics. He found that people tended to evaluate ecological problems as national issues, that younger and better educated citizens were concerned about the environment due to their economic affluence and physical security, and that citizens have favorable attitudes toward environmental protection because they are truly worried about the state of the natural environment.

Attitudes toward land use regulation were evaluated in a survey of southeast Florida residents (DeHaven-Smith, 1988). Results indicated that concerns about land use and growth management were founded primarily upon mundane conditions or irritants of everyday life rather than abstract philosophical or ideological principles. The author concluded that environmental movement leaders are likely to be more successful if they address immediate, localized problems than if they try to garner support with abstract arguments about the relation of man to nature.

Samdahl and Robertson (1989) explored the current body of research on social determinants of environmental concern. They compared results from previous studies with their own results from a 1978 survey of Illinois residents. The authors assessed attitudes regarding proregulatory liberalism, social welfare liberalism, environmental concern and actual personal ecological behaviors. They found that social welfare liberalism did not significantly predict environmental concerns. Furthermore, perceptions of environmental problems did not significantly predict ecological behavior, and age was not a good predictor of perceptions of environmental problems. A proregulatory liberal ideology was a strong predictor of support for environmental regulation but had only a small effect on perceptions of environmental problems and personal ecological behavior. The authors concluded that the effects of ideology are defined by a belief in the broader tenet of proregulatory liberalism and support for government intervention.

Telephone survey data from Kentucky residents were used to focus on the relationship between public environmental knowledge and environmental attitudes (Arcury, 1990). Linkages between knowledge, attitudes and related sociodemographic factors also were explored. The authors used survey items previously applied in other NEP-related research. They found that age had a significant inverse association with environmental concerns, but that the association of age with knowledge was weak and inconsistent. Females were less likely to have high levels of environmental knowledge, while education and income have positive associations with measures of environmental attitudes and knowledge. Living in a metropolitan area also was associated positively with NEP attitudes and environmental knowledge.

Rural-urban differences in environmental concerns were investigated by Freudenburg (1991). His research was conducted in western Colorado communities that were facing the prospect of large-scale development of coal and other energy resources. He developed four scales, which measured support for local development, distrust of corporations, opposition to government regulation and support for planning and zoning. Freudenburg found high levels of overall concern for environmental quality, but the findings also showed that people directly involved in agriculture expressed higher levels of concern about the environment than other rural residents in the same communities. The respondents tended to strongly support economic development but not at the expense of environmental protection. Ranchers did appear to feel slightly better about the environment's current condition, but farmers felt worse. Both farmers and ranchers showed lower than average support for local development and higher than average levels of distrust for industry. Farmers and ranchers expressed lower levels of opposition to governmental environmental regulations than other community residents. Self-identified Republicans tended to show lower levels of environmental concern than self-identified Democrats. Based on all the results, Freudenburg concluded that the agriculturalists in his sample were more concerned about environmental protection than people in any other occupational category.

Public attitudes toward federal forest management were explored by Steel, List and Shindler (1994). Questionnaires were mailed to random samples of Oregon and U.S. residents, and data regarding preferences for a variety of forest management policies, public involvement in decision-making and sociodemographics were collected. Likert scales were used to assess attitudes and preferences for forest management policies. Support for ecosystem-based policies among both the Oregon and national publics was very strong. The national public was found to hold stronger biocentric (rather than anthropocentric) views when compared with the Oregon public, probably due to economic reliance on the timber industry in Oregon.

A statewide mail survey of Pennsylvanians assessed NEP attitudes and behaviors (Scott and Willits, 1994). There was broad acceptance of NEP, but respondents were not consistent in their feelings about the place of human beings in the ecological order. The authors found only weak linkages between NEP attitudes and environmental behaviors, but relatively strong relationships

between social characteristics and environmental behavior. Females were more likely than males to indicate they had made purchase decisions in terms of environmental considerations. Increasing education, income and political liberalism were associated with increased environmental behavior.

Variation in public support for environmental protection was explored by Elliott, Regens and Seldon (1995). These authors applied regression analysis to national public opinion data and found that as income increases, support for additional spending on environmental policies also increases. Thus, improving economic conditions makes citizens more likely to support environmental spending. Elliott, Seldon and Regens (1996) used an ordered probit analysis to derive probabilities that individuals will say there is too little, just right or too much government spending on environmental programs. They concluded that support for environmental spending is subject to many forces, including sociodemographic factors, attitudes, political affiliations and economic circumstances.

Using data from northern Virginia, Stern, Dietz and Guagnano (1995) tested the relation of NEP to a scale measuring awareness of general environmental conditions. They concluded that both NEP and general scales measured general beliefs about the nature of human-environment interactions, and that NEP was correlated highly with general environmental beliefs. Finally, the authors characterized NEP as a measurement of "folk" ecological beliefs consistent with larger, more basic value orientations.

Guagnano and Markee (1995) assessed the influence of sociodemographic variables on four environmental concern measures in 19 U.S. metropolitan areas. Likert-style scales were used to measure environmental attitudes. They incorporated items dealing with trust toward business, industry and politicians, views regarding who is responsible for protecting the environment, confusing information about the environment and the economic consequences of environmental protection. Analysis of variance results indicated that age, education and income had significant effects on trust levels. Older respondents had significantly higher levels of trust in business, industry and politicians with respect to environmental protection, while higher educational levels resulted in significantly less trust. Analysis of interactions showed that trust by respondents in the West increased as income increased. With respect to economic trade-offs, the youngest age cohort in the West reported the lowest concerns about economic trade-offs from environmental protection. Females in most regions were less likely than males to report an economic trade-off involved with environmental protection.

The goal of Pelletier, Legault and Tuson (1996) was to construct a prototype Environmental Satisfaction Scale. They sought to measure individuals' satisfaction with environmental conditions and satisfaction with government environmental policies. Study participants included employed adults and undergraduate students at the University of Ottawa, Canada. A Likert-style response scale was used. Satisfaction with environmental conditions was correlated positively with feelings of optimism, confidence and security. Dissatisfaction with government policies was associated with a higher frequency of proenvironmental behaviors, while dissatisfaction with local environmental conditions also was associated with a higher incidence of these behaviors (such as recycling).

Brunson and Steel (1996) conducted telephone surveys across the United States and in Oregon to explore attitudes toward managing federal rangelands, knowledge about the environmental condition of federal rangelands, confidence in range management institutions, influences of different rangeland constituencies and attributes that influence environmental beliefs. In Likert-type scales, they used elements of Dunlap and Van Liere's NEP scale. Both national and Oregon results indicated a public preference for a more preservationist, less livestock-oriented approach to federal rangeland management. The authors found it surprising that Westerners were more likely to support a preservationist approach to range management.

Tarrant and Cordell (1997) compared previously applied environmental attitude scales and their consistency with self-reported environmental behavior. Higher scores for all of the scales compared were consistent with increased environmental behavior. However, the strength of attitude-behavior correlations tended to decrease as income increased, and education decreased and for more conservative people. Data used in the study were the result of telephone interviews with residents of southern Appalachia.

Wagner et al. (1998) compared and contrasted attitudes about forestry management between the general public and forestry professionals in Ontario, Canada. Using telephone survey data,

they found that forestry professionals tended to be less supportive of some environmental values than the general public.

Carman (1998) hypothesized that environmental policy support in the United States is a function of three factors: an individual's qualitative assessment of the environment; the individual's perception of government regulation of the environment; and the individual's evaluation of the trade-offs between environmental protection and economic forces. He used national data to derive scale indicators for the three factors and regression analysis to examine their relationship to various explanatory factors. He determined that race, age, attention to news on the environment and political ideology were strong predictors of one's assessment of environmental quality, economic concerns and concern about environmental regulations. He concluded that his research helped to demonstrate why there are different "types" of environmentalists, including conservative, market-emphasizing ones.

Environmental opinions in the western United States were the subject of a study by Nie (1999). He analyzed and compared the results of numerous studies and surveys conducted by other researchers. Nie's review of previous research led him to conclude that proenvironmental opinion in the West is strong, positive and pervasive. He found strong evidence of environmental values (i.e., NEP) throughout the West, based on others' findings. Urban-rural differences in the West complicate a comprehensive regional assessment of environmental attitudes. However, there is little research that points to significantly lower levels of environmentalism among rural residents in the West. Rural residents do tend to question federal dominance of the region, but they also simultaneously hold many proenvironment attitudes. Westerners also express a general willingness to make economic trade-offs and sacrifices to ensure environmental protection.

Attitudes toward wildlife damage management and policy were studied by Reiter, Brunson and Schmidt (1999). Their nationwide mail survey used questions specific to wildlife damage and management issues, as well as NEP scale questions to assess general attitudes toward the environment. They found that most respondents believed that society has a need and a right to control wildlife damage and that governments should play a role in meeting that need.

Lichtenberg and Zimmerman (1999) assessed farmers' attitudes toward pesticides, water quality and related environmental effects.

The research was based on data from a mail survey of farm operators in Maryland, New York and Pennsylvania in the mid-1990s. The authors found that the farmers generally believed that water quality problems from agricultural chemicals were moderately serious. They also concluded that farmers' information sources influence their concern levels about environmental problems associated with agricultural chemicals. The more important a survey respondent considered the news media as a source of information, the more concern the respondent exhibited about both general environmental problems and those associated with agriculture.

Public opinion about endangered species conservation and policy was the subject of research by Czech and Krausman (1999). These authors used a random sample of 2,500 U.S. households drawn from a telephone list. Visual analog scaling and multiple-choice questions were used to assess public opinion. Results indicated that species conservation is valued by respondents as much as property rights and economic growth. Ecosystem health and democracy also are valued at very high levels. Czech and Krausman concluded that solid majorities will continue to support the Endangered Species Act.

Steel, Lovrich and O'Toole (1999) examined public attitudes toward salmon restoration in the Pacific Northwest. Mail surveys were sent to Oregon households to generate data for the research. Regression analysis was conducted with the dependent variable specified as the survey respondents' perceived level of threat to Oregon's salmon runs. Independent variables were sociodemographic variables, interest factors and value orientations. Younger respondents and women were significantly more likely to perceive a variety of real threats to salmon survivability than older and male respondents. More highly educated people also identified a greater variety of serious threats than less formally educated respondents. Respondents who depended upon natural resource extraction industries for their economic livelihood were significantly less likely to perceive threats to salmon. Political orientation (liberal versus conservative ideology) did not have a significant effect in the model.

AGRARIAN FUNDAMENTALISM

Flinn and Johnson (1974) developed a series of propositions or tenets that they believed defined agrarian or farm fundamentalism attitudes. These propositions were based on agrarian ideology as it has been defined or developed for thousands of years. Thomas Jefferson usually is thought of as the father of American farm fundamentalism, and while he was an important contributor, he also appropriated many of his ideas from Greek, Roman and other earlier philosophers. Since the time of Jefferson, other Americans also have contributed to what is often termed "the American Agrarian Ideology," including William Jennings Bryan. Based on extensive review of literature and historical documents, Flinn and Johnson (1974) established five tenets of farm fundamentalism. The tenets were described in the 1974 article, and are listed here.

The first tenet held that "farming is the basic occupation on which all other economic pursuits depend for raw materials and food." The second tenet maintains that "agricultural life is the natural life for man; therefore, being natural, it is good, while city life is artificial and evil." A third aspect of agrarianism was founded on the farmer's complete economic independence and individualism and the inherent value of that independence. The fourth tenet proclaims that "the farmer should work hard to demonstrate his virtue, which is made possible only through an orderly society." The fifth tenet is that "family farms have become indissolubly connected with American democracy."

Using these five tenets of agrarianism, the authors constructed an attitude scale or index. Using Likert-type scale items to capture the tenets' essence, they administered a mail survey questionnaire with the items to a random sample of Wisconsin farm operators in 1965. Flinn and Johnson (1974) found that levels of agrarianism were higher among farm operators who were relatively older, less educated, with lower incomes, debt free, long-time farmers, small farm operators and seldom in contact with cooperative extension or other agricultural college specialists.

Buttel and Flinn (1975) conducted additional survey research in Wisconsin in 1971, using survey items developed in the Flinn and Johnson (1974) research. The 1975 research was conducted using a statewide sample that included both rural and urban residents. Results indicated that increased education was associated with weakened agrarian ideology, and that a respondent's farm origin was an effective predictor of agrarian values. Respondents' current place of residence (i.e., rural or urban) was not a strong correlate of agrarian ideology. The authors originally predicted that people holding agrarian values would be more alienated and discontented with American society than people not expressing agrarian beliefs. This hypothesis was supported by the results, particularly among urban residents. Overall, Buttel and Flinn (1975) found few differences in agrarianism between urban and rural residents.

Degrees of agrarianism among farmers in four areas of the United States were compared by Carlson and McLeod (1978). The regions studied were eastern Washington and northern Idaho, north-central Idaho, south-central Idaho and Wisconsin. The "Agrarianism Scale" developed by Flinn and Johnson (1974) was applied through a mail survey. There were some differences in levels of agrarianism between the regions. The correlation between low farm income and stronger agrarianism was present in some regions, but not all. The authors concluded that agrarianism was of sufficient importance that it should enter into resource conservation policy implementation in rural areas.

The Agrarianism Scale also was applied in Australia by Craig and Phillips (1983). These authors compared and described the Australian agrarian ideology relative to American agrarianism and also compared Agrarianism Scale results for southern Australia, Idaho and Wisconsin. They found a high congruence level between Australian agrarianism and American agrarianism, as measured using the scale.

In response to major shifts in the U.S. population from farms to urban areas during the last half of the 20th century, several researchers began questioning the status of farm fundamentalist thinking around the country. They wondered if agrarianism was diminishing and hypothesized that if it was, then the U.S. farm sector would soon lose its relatively favored position as a recipient of federal support and its exemption from increasing environmental quality standards. The 1986 Farming in American Life Survey consisted of a weighted probability sample of several thousand U. S. civilian households in the continental United States. A mail questionnaire was sent to the households and included several items previously used in the Agrarianism Scale. Molnar and Wu (1989) reported that people who had grown up on a farm, presently lived on a farm, or had income from a farm expressed higher levels of support for

agrarian beliefs. Women and those who rated themselves as politically moderate had higher levels of agrarianism. The South was the most agrarian region in the sample. Agreement with agrarian sentiments increased with age and decreased with education and income. Molnar and Wu concluded that agrarianism was tied firmly to rural and agricultural experiences, that declining agricultural fundamentalism would be in direct competition with rising environmental concerns in the future and that continued direct payments to farms would be in jeopardy as a result.

Tweeten and Jordan (1988) also analyzed Farming in American Life Survey data. These authors emphasized that while agrarian beliefs were relatively strong in both rural and urban populations, farm fundamentalism would diminish as young people age and as people become more educated, wealthy and urban. Tweeten and Jordan concluded that there ultimately would be less support for legislation and government programs that favor the agricultural sector.

Dalecki and Coughenour (1992) further analyzed the data from the Farming in American Life Survey and determined that support for agrarian themes and images was quite widespread. They stated that the historic persistence of agrarianism in American culture and society derived from complex linkages between values and beliefs.

APPENDIX B: COVER LETTER AND QUESTIONNAIRE

COLLEGE OF AGRICULTURE AND HOME ECONOMICS

DEPARTMENT OF AGRICULTURAL ECONOMICS
AND AGRICULTURAL BUSINESS
Box 30003, MSC 3169
Las Cruces, New Mexico 88003-8003
Telephone: (505) 646-3215
Fax: (505) 646-3522

July 18, 2000

I am a researcher at New Mexico State University. I am investigating what New Mexico residents think about environmental issues generally, and water quality issues specifically.

As you are probably aware, water quality policies and regulations in New Mexico are the result of both Federal and state legislation. One of these laws is the Federal Clean Water Act, passed in 1972.

Water quality is a major environmental issue. Regulations affecting water quality have changed in recent years, and are likely to change in the future. Citizens, communities, and industries in New Mexico have been and will be impacted by these regulations.

To better understand the potential outcomes of future water quality regulations in New Mexico, and citizens' attitudes about a broad range of water quality issues in our state, I am asking you to take a few minutes to complete this survey. Your participation is voluntary, and your opinions are <u>very</u> important to the future of water quality policy in New Mexico.

All your responses will be kept confidential. The questionnaire has an identification number for mailing purposes only. This is so that we may check your name off the mailing list when your questionnaire is returned. If you would like to speak to me in person, please contact me by phone at 505-646-2401 or by email at **rskaggs@nmsu.edu**. I have enclosed a postage-paid business reply envelope for your use.

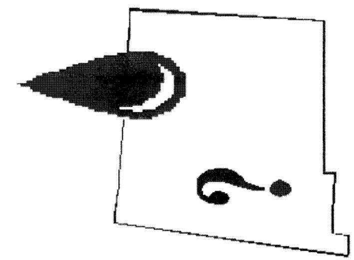
Thank-you in advance for participating and returning this survey questionnaire.

Sincerely,

Rhonda Skaggs
Professor
Agricultural Economics

WATER QUALITY and the ENVIRONMENT in NEW MEXICO. . .

WHAT DO <u>YOU</u> THINK?



Your opinions about agriculture and water quality…

Please circle the number following each statement that best describes your opinion.

Statement	Strongly Disagree		Don't Know		Strongly Agree
1. Agricultural landowners will voluntarily reduce water pollution.	1	2	3	4	5
2. The New Mexico agricultural community's compliance with environmental regulations has been poor.	1	2	3	4	5
3. Farmers should be required to reduce their use of farm chemicals to protect water resources.	1	2	3	4	5
4. Agriculture is the most basic occupation in our society, and almost all other occupations depend on it.	1	2	3	4	5
5. All of us depend on farming and ranching for our basic necessities.	1	2	3	4	5
6. Family farms and ranches must be preserved because they are a vital part of our heritage.	1	2	3	4	5
7. Agricultural water pollution is a serious threat to fish and wildlife.	1	2	3	4	5
8. Agriculture is being unfairly blamed as a cause of water quality problems.	1	2	3	4	5
9. Water pollution from farming and ranching can best be controlled through educating farmers and ranchers.	1	2	3	4	5

Statement	Strongly Disagree		Don't Know		Strongly Agree
10. If farmers and ranchers don't do more to protect water water quality on their own, the government should require them to do so.	1	2	3	4	5
11. Hunger will result if water quality laws are enforced throughout the United States.	1	2	3	4	5
12. Enforcing water quality laws will destroy family farming and ranching in New Mexico.	1	2	3	4	5
13. New Mexico farmers and ranchers do not have the right to damage water quality.	1	2	3	4	5
14. New Mexico agriculture is an insignificant contributor to the national food supply.	1	2	3	4	5
15. I am more concerned about the survival of farming and ranching than I am about the environment.	1	2	3	4	5
16. I am willing to pay more for my food in order to protect the environment.	1	2	3	4	5

Your Attitudes About Government and Government Policies

Please circle the number following each statement that best describes your opinion.

Statement	Strongly Disagree		Don't Know		Strongly Agree
1. Water quality laws are a threat to private property rights in New Mexico.	1	2	3	4	5
2. The water quality crisis has been greatly exaggerated.	1	2	3	4	5
3. I trust the government to make the proper decisions about water quality management.	1	2	3	4	5
4. The Federal government is doing a good job of regulating water quality.	1	2	3	4	5
5. The State government is doing a good job of regulating water quality.	1	2	3	4	5
6. Scientists are able to make accurate estimates of the risks of water quality problems.	1	2	3	4	5
7. Tourism in New Mexico will increase if we protect and preserve our water resources.	1	2	3	4	5
8. Current scientific information should decide the outcome of environmental disputes.	1	2	3	4	5
9. The economies of local communities should be given the highest priority when making decisions about water quality policy.	1	2	3	4	5

Statement	Strongly Disagree		Don't Know		Strongly Agree
10. I am pessimistic about the future of water quality in New Mexico.	1	2	3	4	5
11. The public needs to be educated about the costs of environmental regulations.	1	2	3	4	5
12. Strong environmental regulations are damaging our state's economy.	1	2	3	4	5
13. The government will have a difficult time enforcing water quality regulations in New Mexico.	1	2	3	4	5
14. We should do more to protect the environment even if it means losing jobs.	1	2	3	4	5
15. The benefits of water quality improvement outweigh the costs.	1	2	3	4	5
16. The government's water quality standards are unrealistically high.	1	2	3	4	5
17. New Mexico needs tougher government regulations on business to protect the environment.	1	2	3	4	5

Statement	Strongly Disagree 1	2	Don't Know 3	4	Strongly Agree 5
18. It is worth paying more taxes in order to protect the environment	1	2	3	4	5
19. I'm afraid my drinking water supply is contaminated.	1	2	3	4	5
20. Communities in New Mexico will be better off through decisions made by local residents.	1	2	3	4	5
21. To prevent the destruction of natural resources, the government must control private land use.	1	2	3	4	5
22. The primary responsibility for solving environmental problems lies with government rather than individuals.	1	2	3	4	5
23. If an industry cannot control its pollution, the government should become involved.	1	2	3	4	5
24. Regulation of business by government usually does more harm than good.	1	2	3	4	5
25. Government regulations always lead to too much bureaucracy.	1	2	3	4	5
26. The government has too much power over citizens.	1	2	3	4	5
27. People in my community will resist more environmental regulations.	1	2	3	4	5
28. Current environmental laws are concise and effective.	1	2	3	4	5

Statement	Strongly Disagree 1	2	Don't Know 3	4	Strongly Agree 5
29. Environmental regulations in New Mexico are too weak.	1	2	3	4	5
30. Environmental regulations are absolutely necessary.	1	2	3	4	5
31. Many New Mexicans will resist enforcement of more water quality laws in this state.	1	2	3	4	5
32. Government should use all available means to protect the environment.	1	2	3	4	5
33. Limits should be placed on water-based recreation in order to improve water quality.	1	2	3	4	5
34. Improvements in water quality will benefit tourism and recreation industries in New Mexico.	1	2	3	4	5
35. Enforcement of clean water regulations in New Mexico will hurt businesses in the state.	1	2	3	4	5
36. More environmental laws will mean fewer jobs in New Mexico.	1	2	3	4	5

Opinions on Water Quality Policy in New Mexico

Please circle the number following each statement that best describes your opinion.

Statement	Strongly Disagree 1	2	Don't Know 3	4	Strongly Agree 5
1. Public participation in the water quality regulation process in New Mexico is adequate.	1	2	3	4	5
2. It is difficult to obtain water quality data from government agencies in New Mexico.	1	2	3	4	5
3. Many people involved in water quality issues in New Mexico don't understand technical information.	1	2	3	4	5
4. New Mexico's water quality problems can best be resolved at the grass-roots level.	1	2	3	4	5
5. The people of the state should have more say in important environmental decisions.	1	2	3	4	5
6. I don't know who to talk to and get information from about New Mexico water quality issues.	1	2	3	4	5
7. The public isn't adequately informed about meetings that have to do with water quality regulations.	1	2	3	4	5
8. I am actively involved in water issues in my community.	1	2	3	4	5
9. The general public in New Mexico has a good understanding of the state's water issues.	1	2	3	4	5

Statement	Strongly Disagree 1	2	Don't Know 3	4	Strongly Agree 5
10. Public education campaigns on New Mexico's water issues would increase the public's acceptance of water regulations.	1	2	3	4	5
11. Public input keeps the state government from impartially administering water policy.	1	2	3	4	5
12. New Mexico officials who administer environmental regulations lack expertise.	1	2	3	4	5
13. Government should bear the costs of environmental protection.	1	2	3	4	5
14. The presence of instream flows is a good measure of the health of a river.	1	2	3	4	5
15. Government regulations to protect New Mexico rivers have been cost effective.	1	2	3	4	5
16. Industries in New Mexico have done a good job complying with current water quality regulations.	1	2	3	4	5
17. Inadequate funding has reduced New Mexico's ability to comply with current water quality regulations.	1	2	3	4	5
18. The state's water polluters should pay the costs of enforcing water quality regulations.	1	2	3	4	5
19. The state's watersheds would be in poor condition if not for current water quality regulations.	1	2	3	4	5

Environmental Attitudes and Beliefs

Please circle the number following each statement that best describes your opinion.

	Strongly Disagree		Don't Know		Strongly Agree
1. There are serious environmental problems where I live.	1	2	3	4	5
2. Technological development is destroying nature.	1	2	3	4	5
3. I would be willing to reduce my standard of living to help protect nature.	1	2	3	4	5
4. I am attracted to the spiritual qualities of nature.	1	2	3	4	5
5. It bothers me that the world's natural environment is changing so quickly.	1	2	3	4	5
6. All species have an equal right to co-exist on the planet.	1	2	3	4	5
7. People in New Mexico are too concerned about small environmental problems and risks.	1	2	3	4	5
8. Environmental protection is so important that regulations cannot be too strict.	1	2	3	4	5
9. We shouldn't worry about environmental problems, because science and technology will soon solve them.	1	2	3	4	5
10. The balance of nature is very delicate and easily upset.	1	2	3	4	5

10

	Strongly Disagree		Don't Know		Strongly Agree
11. When humans interfere with nature, it often produces disastrous consequences.	1	2	3	4	5
12. Protecting the environment will threaten jobs for people like me.	1	2	3	4	5
13. I am confused about what's good and what's bad for the environment.	1	2	3	4	5
14. Humans are severely abusing the environment	1	2	3	4	5
15. Humans have the right to exploit the natural environment for human benefit.	1	2	3	4	5

11

Open-Ended Questions

Please circle the number following each statement that best describes your opinion.

1) How would you rank the quality of data being used in the development and implementation of water quality policies in New Mexico?

A) Very good
B) Fairly good
C) Fairly bad
D) Very bad
E) Don't know

2) How would you rank the quality of groundwater in New Mexico?

A) Very good
B) Fairly good
C) Fairly bad
D) Very bad
E) Don't know

3) How would you rank the quality of surface water in New Mexico?

A) Very good
B) Fairly good
C) Fairly bad
D) Very bad
E) Don't know

4) Should the State and Federal governments put more, the same amount, or less resources into improving water quality?

A) More resources B) The same resources C) Less resources

5) In your opinion, have current environmental laws and regulations gone too far, or not far enough, or have struck the right balance in protecting the environment?

A) Laws have gone too far
B) Laws have struck the right balance
C) Laws have not gone far enough

6) In the best interests of the Nation, the 1972 Federal Clean Water Act should be…

A) Revoked
B) Weakened to provide less
D) Remain unchanged
E) Strengthened to protect water quality

12

Demographics

1) What is your highest level of education?

A) never attended school
B) some grade school
C) completed grade school
D) some high school
E) completed high school
F) some college
G) completed a Bachelor's degree
H) some graduate work
I) an advanced degree (M.S., Ph.D., etc.)

2) Do you, or any member of your immediate family depend on the timber, livestock, or agricultural industry for your economic livelihood? (Check those that apply.)

A) Timber industry________
B) Livestock industry______
C) Agriculture (crop production)_______
D) None of the above_______

3) On domestic policy issues, would you consider yourself to be (circle a number):

Very liberal 1----2-----3-----4-----5-----6-----7 Very Conservative

4) How would you assess your general knowledge of water issues?

A) Unknowledgeable
B) Informed
C) Knowledgeable
D) Very knowledgeable

5) In what area of water issues are you the most knowledgeable?

A) Policy
B) Hydrology
C) Biology
D) Environmental Science
E) Law
F) Ecology
G) Irrigation systems
H) Municipal Supply
I) Engineering
J) Economics
K) Social Issues
L) History
M) Other__________________
(please specify)

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6) How familiar are you with provisions of the 1972 Federal Clean Water Act?

A) Not familiar at all
B) Somewhat familiar
C) Very knowledgeable

7) How familiar are you with the Total Maximum Daily Load (TMDL) provisions of the 1972 Federal Clean Water Act?

A) Not familiar at all
B) Somewhat familiar
C) Very knowledgeable

8) Which of the following best describes your place of residence?

A) Rural area
B) Town of 2,500 or less
C) City of 2,501 to 25,000
D) City of 25,001 to 50,000
E) City of 50,001 to 100,000
F) City of over 100,000

9) Where do you get most of your information about environmental issues?

A) Friends and family members
B) Government agencies
C) Newspapers and magazines
D) Television and radio
E) Internet
F) Other_______________

10) How old are you?

A) Less than 20 years
B) 20 – 30 years
C) 31 – 40 years
D) 41 – 50 years
E) 51 – 60 years
F) 61 – 70 years
G) 71 or older

11) What is your gender?

A) Male
B) Female

12) What is your ethnic background?

A) Anglo
B) Hispanic
C) African-American
D) Asian
E) Native American
F) Other_______________

13) Please estimate your total household income, from all sources.

A) Less than $20,000 per year
B) $20,000 - $40,000 per year
C) $41,000 - $60,000 per year
D) $61,000 - $80,000 per year
E) $81,000 - $100,000 per year
F) More than $100,000 per year

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THANK YOU FOR YOUR PARTICIPATION. ANY COMMENTS YOU MAY HAVE CAN BE WRITTEN HERE.

APPENDIX C: CORRESPONDENCE

Norm Plank, 06:15 AM 08/02/20, survey

Delivered-To: alias-outgoing-rskaggs@nmsu.edu@outgoing
Date: Wed, 02 Aug 2000 06:15:44 -0600
From: Norm Plank <normp@zianet.com>
X-Accept-Language: en
To: rskaggs@nmsu.edu
Subject: survey
Content-Length: 223

RHONDA—I'M GETTING A LOT OF CALLS ON THE SURVEY YOU RECENTLY SENT OUT. WILL YOU FOWARD ME A COPY? WHAT IS THE INTENT OF IT? HOW WAS THE LIST OF FARMERS SELECTED FOR THE SURVEY? PLEASE GIVE ME A CALL WHEN YOU CAN. THANKS

Printed for Rhonda Skaggs <rskaggs@nmsu.edu>

NEW MEXICO FARM AND LIVESTOCK BUREAU

P. O. Box 20004 • Las Cruces, New Mexico 88004 • (505) 532-4700 • FAX (505) 532-4710

Rhonda Skaggs
College of Agriculture and Home Economics
NMSU
Box 30003, MSC 3169
Las Cruces, N.M. 88003-8003

8/14/2000

Dear Rhonda,

Thanks for forwarding the copy of your survey that was received by some of our members. After reviewing the questions and tenor of this survey I have a few questions and concerns.

We have lots of experience with scientific surveys from political to internal polling and focus group research.

On first blush the questions in this survey are, to say the least, loaded and very subjective. Maybe we're overly sensitive but it appears that the questions are biased against agriculture from the very beginning. We would like to know who this survey is being done for, what will it be used for and who is paying for this work? If it's a state or federal environmental agency we would be very concerned.

In addition, we would like to know the scientific polling technique used to formulate the responder universe. The make-up of this group of people is very important. Because the questions are so subjective and volatile, if one side or another is favored numerically, it would render the survey totally useless and slanted.

While there appears to be an attempt to balance the questions "for" and "against" agriculture the overall impression I came away with was that we are being set up for something. That shouldn't be the tone or intent of such a survey and many of our members have the same impression.

There are questions in this survey we've seen before in the public statements of radical environmental groups. For example, question #14 "New Mexico agriculture is an insignificant contributor to the national food supply" is a totally inaccurate assumption that is usually bantered about by the likes of Kieran Suckling of the Center for Biological Diversity. And what does this have to do with water quality?

The questions also track the mentality of federal and state bureaucracies such as "paying more taxes to protect the environment" and "I'm afraid my drinking water supply is contaminated." Such statements are right out of the book of fear mantra espoused by the current Administration for purely political reasons.

There is also a great deal of interest in this survey in "government control" of private lands, more regulation and laws. Is this survey going to be used to call for more of those odious impairments to our freedom and property rights?

I have other concerns about people receiving this survey who have no technical or practical expertise in such a complicated set of issues. In fact, we have an elected legislature and executive branch that are charged with dealing with the concerns addressed in this survey. I think the members of the N.M. Water and Natural Resources Committee in the House and the Senate Conservation Committee would also be very concerned with this lopsided questionnaire.

And finally I must say I was shocked at the tone of the statements on pages 10 and 11 such as "Technological development is destroying nature" which is right out of the Earth First handbook a group that calls for the overthrow of our constitutional republic by violent means.

Let me reiterate our serious concern about who is behind this survey, who formulated the questions, what scientific methods were used in the production of this survey and what will it be used for ultimately? These are also the concerns of our members and recipients of the survey.

I think if these base questions can be answered satisfactorily we can move forward. I look forward to discussing these concerns with you and Dean Schickedanz.

Regards,

Norm Plank
Executive Vice President

X-Originating-IP: [207.66.82.146]
From: "New Mexico Water Dialogue Exec_Director" <water_dialogue@hotmail.com>
To: rskaggs@nmsu.edu
Subject: Water Survey
Date: Thu, 03 Aug 2000 18:04:57 MDT
X-OriginalArrivalTime: 04 Aug 2000 00:04:57.0861 (UTC) FILETIME=[A0313B50:01BFFDA7]
Content-Length: 2455

Dr. Skaggs:

I recently received your survey in the mail (and a reminder postcard, two days later). I am happy to fill out the survey, but as Executive Director of the New Mexico Water Dialogue, this is the sort of work that interests me, and I do have a few questions.

First, how was my name selected for the survey?

Second, are you aware of the recent New Mexico Conservation Voters Alliance/League of Conservation Voters Education Fund survey? The two surveys seem very similar, and I am somewhat perplexed by the need for two within the span of one year. Also, I hope you are aware of the recent survey done by John Brown at the Institute of Public Policy at UNM, on water issues across the state, and also in the Middle Rio Grande region.

Third, you state that respondents' opinions are very important to the future of water quality policy in New Mexico. What is the actual intent of this survey with regard to policy development? Is it sponsored by the state (or someone else) in order to obtain a clearer picture of opinions about water? Is it something you are doing to compare with the results of the NMCVA/LCVEF and IPP surveys? Of course, I recognize that you may not want to tell me too much about your hypotheses, as that could affect my response, but I am quite interested in the research. Perhaps we could discuss this, in particular, in more depth after I have filled out the survey and mailed it in!

In the event that you are not aware of the New Mexico Water Dialogue, we are a statewide non-profit whose mission is to promote the wise stewardship of water resources in New Mexico through support of community-based planning and creation of inclusive forums for education, communication, and the development of common ground. We put out a newsletter, Dialogue, hold an annual statewide meeting (our meeting this past January was on Balancing the Uses of New Mexico's Water), and hold workshops to discuss water issues across the state. I'd be happy to send you a copy of our upcoming newsletter issue on public participation in water issues.

Thanks for your response.

Sincerely,

Sharon Hausam

New Mexico Water Di, 06:04 PM 08/03/20, Water Survey

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Sharon Hausam
Executive Director
New Mexico Water Dialogue
508 1/2 South 3rd St.
Gallup, NM 87301
phone/fax: 505-726-8211

New Mexico Water Di, 10:44 AM 08/23/20, Re: Water Survey

X-Originating-IP: [207.66.82.132]
From: "New Mexico Water Dialogue Exec_Director" <water_dialogue@hotmail.com>
To: rskaggs@nmsu.edu
Subject: Re: Water Survey
Date: Wed, 23 Aug 2000 10:44:12 MDT
X-OriginalArrivalTime: 23 Aug 2000 16:44:12.0656 (UTC) FILETIME=[5DE22F00:01C00D21]
Content-Length: 1561

Dr. Skaggs:

The survey that I referred to was commissioned by the New Mexico Conservation Education Fund and the League of Conservation Voters Education Fund, and was done by Research & Polling, Inc. I have two addresses: 5140 San Francisco NE, Abq, 87109-4640, 505-821-5454 (probably Research and Polling), and LCVEF, 2060 Broadway, Suite 230, Boulder, CO 80302, 303-541-0373 -- the person to talk to is Sheena Logothetti.

The survey relates to environmental issues in general, but does note that "voters express greatest concern with environmental issues relating to water." There are questions about enforcement of environmental laws, environment and economy, health of the bosque, environmental monitoring, reasons for supporting environmental regulations, and likelihood of voting for environmentally-minded candidates, among others.

I am also still curious about the list used to generate the mailing list. It would seem that there would be a strong bias towards economic development and growth -- possibly (though not necessarily) as opposed to environmental protection -- when using a list compiled by an economic development group. Or does Bob Coppedge's group work to include environmental interests in their list?

-Sharon Hausam

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Sharon Hausam
Executive Director
New Mexico Water Dialogue
508 1/2 South 3rd St.
Gallup, NM 87301
phone/fax: 505-726-8211

APPENDIX D: SPREADSHEET APPLICATION

The Attitudes Toward the Environment, Agriculture and Government Assessment Tool is available for use by individuals and groups involved in environmental policymaking, regulatory or management processes. The Excel™ spreadsheet program can be obtained as outlined below.

The Attitudes Toward the Environment, Agriculture and Government Assessment Tool can be downloaded from the following address: http://cahe.nmsu.edu/pubs/research/. Click on the Economics category, look for RB 786 and choose "Supporting Materials."

Or, if you would like to receive a complimentary CD copy of the Attitudes Toward the Environment, Agriculture and Government Assessment Tool, please communicate your request in writing, via telephone, fax or e-mail to the address below. Questions about using the spreadsheet program should be directed to the same address.

Rhonda Skaggs, Professor
Dept. of Agricultural Economics and Agricultural Business
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Las Cruces, NM 88003
Phone: (505) 646-1344
Fax: (505) 646-3808
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