Does the environmental orientation of local officials affect local environmental policies?

Kate Shanks
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I.) Executive Summary

People often discuss the need to educate local officials about the environment, but little research has been done to support that need. The need to educate this group is based primarily on anecdotal evidence—green partnerships getting underway in Louisville and Lexington and similar efforts in other municipalities that are supported by local officials. Some believe that if you educate local officials about the environment they will become environmentally responsible citizens who promote and support more progressive environmental policies.

Several models exist that describe environmental responsibility. In its most basic form environmental responsibility is a function of knowledge, attitudes and behavior. However, values and interests also shape environmental attitudes. Environmentally responsible behavior has been shown to be a function of environmental values, personality traits, gender, psychological variables and the situational context.

Local Agenda 21 (LA 21), which was adopted at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janerio, Brazil in 1992, outlines a planning process that provides an opportunity for local governments to work within their communities to adopt sustainable practices. Since then, local sustainability efforts in the U.S. have taken many forms including curbside recycling, brownfield redevelopment, mass transit and the formation of citizen advisory councils.

Researchers have found communities that adopt sustainability programs are older and less reliant on manufacturing. They are often a host to a major university and tend to have higher levels of education attainment. Kentucky communities are not among the small list of U.S. communities that have adopted LA 21 strategies. However, environmental progress is happening in Kentucky's communities.

The purpose of this research is to better understand the relationship between environmental responsibility of local officials and local environmental policies. Two questions are answered with this research:

1.) Are local officials environmentally responsible citizens?

2.) Do environmentally responsible local officials produce environmentally progressive policies?

In this study environmental responsibility is measured by environmental knowledge, attitudes and behavior. A survey was administered to the county judge executives in Kentucky and the two mayors of merged governments to collect data on this. The data collected were analyzed with respect to:

- respondents individual characteristics such as age and income; and

- responses from the same survey administered to a sample of Kentuckians in 2004; and

- solid waste management data, which serve as indicators of environmental progress, from the respondents corresponding counties.

The findings of this research are mixed. Attitudes do not appear to be a function of environmental knowledge. Behavior, though, was linked to environmental knowledge and attitudes but only in bivariate analysis.

The group surveyed is fairly knowledgeable about the environment. They answered more questions correctly than a sample of Kentuckians surveyed in 2004. They were similarly concerned about the environment as the Kentucky sample, but did report more environmentally responsible behavior.

Based on this analysis, environmental knowledge is a function of the respondents' education attainment level. An increase in education increased environmental knowledge. Attitude is a function of political affiliation. Democrats expressed more concern and support for the environment than republicans. Finally, reported environmentally responsible behavior (ERB) is a function of the respondents' age, number in household and years of service. All of which positively correlated to ERB.

Five indicators of environmental progress were used but only two—presence of curbside recycling and employment of a full-time solid waste coordinator—correlate to local officials' environmental knowledge in multivariate analysis. Knowledge is inversely correlated to curbside recycling and is positively correlated to the employment of a full-time solid waste coordinator. Other variables including population density and county median household income positively correlated to these variables.

To better understand the relationship between environmental responsibility of local officials and local environmental policies, more research is needed. A larger sample including other county and city local officials should be surveyed. More research should be done to better understand the correlation between factors related to urbanization and local environmental policies. Based on the literature review, local officials need to be aware of their role in the sustainability effort in the U.S. Local governments, given that they are closest to the people and environmental problems, play a pivotal role. While other factors such as special interest groups and environmental problems may be demanding stronger environmental policies, local officials will be a part of proposing and adopting those policies.

II.) Statement of the Problem

Environmental educators often discuss the need to educate local officials about the environment. The theory is that environmentally literate local officials will instigate and support policies that promote a healthy environment. Furthermore, environmentally literate local officials will not violate environmental regulations. The need to educate local officials is based on anecdotal evidence and is fueled somewhat by new initiatives in Louisville and Lexington.

Recently in Louisville and Lexington, green partnerships have been established to develop more progressive environmental policies. The president of UofL, the mayor of Metro Louisville and the superintendent of Jefferson County Public Schools have teamed up to spearhead the green partnership in Louisville. As a result, committees have formed to examine environmental issues such as energy and waste reduction, water quality and environmental education. With the support of the leaders in Louisville, initiatives such as pooling resources to buy recycled paper in bulk are able to be adopted. People with decision making authority are leading these committees because the local leaders have made the partnership a priority (University of Louisville, 2004). The partnership has attracted grant funding. Other communities can initiate similar partnerships, but to do so there needs to be leadership.

It is believed that to initiate sustainability programs in other communities, local leaders need to be educated about the environment and need to have the will to push environmental initiatives. However, it is unclear if local officials can answer basic questions about the environment and if they express attitudes and exhibit behavior that one would equate with an environmentally responsible citizen. Furthermore, while it is believed that environmentally responsible local officials will produce stronger environmental policies, it is unclear if that is

true. Are environmentally responsible local officials driving environmental progress or is it something else? There are two questions to be answered:

1.) Are local officials environmentally responsible citizens—meaning that they are knowledgeable about the environment, express concern for the environment and exhibit environmentally responsible behavior (ERB)?

2.) Do environmentally responsible local officials produce environmentally friendly policies?

I took two steps to answer these questions. First, a survey of environmental knowledge, attitudes and behavior was administered by mail to county judge executives in all 120 counties. The mayors in Lexington and Louisville were also included because they represent merged government. Scores were given to respondents based on their responses to the survey. Then I analyzed the data with statistical tests to: 1.) compare the knowledge, attitudes and behavior among local officials and between local officials and Kentucky's citizens; and 2.) determine a correlation between the survey scores for knowledge, attitudes and behavior and indicators of environmental progress at the local level.

The findings of this research could influence future decisions regarding the education of local officials. The findings could also identify factors that lead to environmental progress at the community level.

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III.) Discussion of Relevant Facts

The Tbilisi Declaration provides guidance to building an environmentally responsible citizenry. The declaration was adopted at the Intergovernmental Conference on Environmental Education held in October of 1977 in Tbilisi, Georgia (USSR). It was adopted by consensus of

the 265 delegates and 65 representatives that participated in the conference (Tbilisi Declaration, 1978). According to the declaration, an environmentally responsible person is one who is aware of environmental problems, has a basic understanding of the environment and its associated problems, is concerned about the environment, exhibits skills necessary to protect the environment and also participates in environmental problem solving. Environmental education is seen as the vehicle to increase awareness, knowledge, concern and environmental problem solving skills among people, thereby creating an environmentally responsible public (Hungerford and Volk, 1990).

Not everyone agrees with the framework of the Tbilisi Declaration. Dr. Michael Sanera's framework is dramatically different. Sanera is executive director of the Center for Environmental Education Research. Sanera's research on the biased nature of environmental education led him to develop a framework that is centered only on science-based knowledge. Environmental education should not include attitude development, skill building or participation in environmental problem solving. Sanera argues that environmental education is biased in practice not in theory. In his research he examines textbooks, teacher training and children's books and cites several examples of bias in those textbooks.

Sanera also explains that training is insufficient to prepare educators to teach all parts of environmental education. He argues that to address science, values, economics and behavior change, educators would need to be scientists, psychologists, economists, and political scientists. Educators do not embody those professions, and he argues that as a result they address only certain parts of the declaration's framework (Sanera, 1998).

Despite the disagreement, Kentucky's environmental education work embodies the Tbilisi framework. Kentucky is a national leader in environmental education. Kentucky's state

master plan for environmental education has been used as a model by 11 other states and provinces. The state's certification program is the only standards-based, classroom-oriented program in the country. Kentucky is the only state with university partnerships for environmental education. Four of these universities now offer endorsements in environmental education for certified teachers (Eller, 3/20/2006).

Despite Kentucky's reputation for being a leader in environmental education, a minimal effort has been made to educate local officials about the environment. The Environmental Quality Commission in 1993 produced the "Local Officials Guide to Kentucky's Environment." This was distributed to elected officials throughout the state. The outcomes of this effort are unknown.

Local officials are required to earn continuing education credits. Continuing education programs are offered by the Kentucky Association of Counties and credits are tracked by the Governors Office of Local Development. Environmental education is not part of the track provided. Some environmental training is offered, but it is only training that teaches local officials about environmental regulations. Similar training programs are offered to city officials.

Local officials have an important role to play in developing and implementing environmental policies. The significance of their role is outlined in the Local Agenda 21 (LA 21), which was adopted at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, 3 to 14 June 1992. LA 21 outlines a planning process that provides an opportunity for local governments to work within their communities to adopt sustainable practices. According to chapter 28, *Local Authorities Initiatives in Support of Agenda 21*,

> "Because so many of the problems and solutions being addressed by Agenda 21 have their roots in local activities, the participation and cooperation of local authorities will be a

determining factor in fulfilling its objectives. Local authorities construct, operate and maintain economic, social and environmental infrastructure, oversee planning processes, establish local environmental policies and regulations, and assist in implementing national and subnational environmental policies. As the level of governance closest to the people, they play a vital role in educating, mobilizing and responding to the public to promote sustainable development." (Local Agenda 21)

Kent E. Portney (2002) conducted research in 2002 that identified 24 cities with established policies that support sustainability. Kentucky is not represented in this pool. Despite this environmental progress is happening at the local level. Participation in curbside recycling has increased by 23 percent since 1993. In 2004, statewide participation rates for all waste types were at an all time high of 88.6 percent, and Kentucky was recognized as the number one state for waste tire cleanup and recycling. Over 22,000 illegal dumpsites have been cleaned since 1993. In 1995, counties reported 4,528 illegal dumps to be cleaned. In 2004 that number was only 621 (Kentucky Division of Waste Management, 2004).

Also the formation of green partnerships in Louisville and Lexington are sustainability projects. They are fairly new and have not been included in past research about sustainable cities, but these projects could add Louisville and Lexington to the list of leaders in sustainability.

IV.) Literature Review

Two bodies of research were examined to study the problem described in section II. First, environmentally responsible behavior (ERB) and its predictors were studied. ERB is the ultimate goal of environmental education, and it is measured in this study of local officials. Many models exist that describe what influences ERB. Second, research was done to better understand what drives sustainability at the local level. Is local leadership a factor? Are

community characteristics, such as median household income, median age and average education attainment level factors that affect sustainability efforts?

Understanding Environmentally Responsible Behavior

Ultimately the goal of education is to shape behavior. Therefore the goal of environmental education is to shape behavior that affects the environment. The theory is that by meeting the objectives outlined in the Tbilisi Declaration, people will have the tools they need to change their behavior in a way that positively affects the environment. The declaration provides a basic outline for increasing environmental responsibility in people. Since it was written, researchers have studied environmental behavior in depth to better understand what leads to environmentally responsible behavior (ERB) (Hungerford and Volk, 1990).

While ERB is the goal of environmental education, it is not something that everyone feels is important. Researchers have examined the effect of religion on individuals' attitude and willingness to protect the environment. Lynn White published an article in 1967 about how literal interpretations of the bible (specifically the first chapter of Genesis) have led to reduced concern for the environment because it tells people to " be fruitful," "multiply" and "have dominion over the earth." Those interpreting the bible literally, find little reason to protect the environment since it was created for man. She concludes that members of Judeo-Christian groups have less concern than nonmembers.

There are critics to this theory. Religion can have the opposite effect. The Evangelical Environmental Network has an Evangelical Declaration on the Care of Creation that encourages environmental stewardship. However, subsequent researchers (Eckberg and Blockert, 1987;

Hand and Van Liere, 1984) have also found members of Judeo-Christian groups to be less concerned about the environment.

Literal interpretation of the bible does not just lessen concern for the environment. In some cases it encourages it. Some people welcome environmental degradation because they see it as an indicator that the apocalypse is approaching (Carroll, 2005).

Early research about ERB was based on the Schwartz's norm-activation theory, which explained altruistic behavior in general (Corbett 2005). Based on this theory, ERB arises from the activation of a personal moral norm. This activation occurs when a person learns about environmental problems and their consequences and feels an obligation to act (Schwartz, 1977).

A second theory that explains environmentally responsible behavior—intrinsic satisfaction—has developed over the last 15 years. Intrinsic satisfaction focuses on actions taken for immediate, personal self-interested reasons. The ultimate effect of ERB motivated by intrinsic satisfaction may be environmentally or socially beneficial but it happens because of self-interest.

Raymond De Young (2000) examined nine studies that outlined the structure of intrinsic satisfaction. Four themes emerged. Links were found between ERB and satisfaction from competence or enjoying being able to solve problems. ERB was also associated with satisfaction from frugality and participation in one's community. Finally, ERB was linked to luxury in that there was no conflict between ERB and having a modest level of material well-being.

Another theory that merges the altruistic and self-interest approaches is the Reasonable Person Model (RPM) (Kaplan, 2000). Kaplan argues the altruistic approach implies sacrifice, and the notion of having to sacrifice drives people away from ERB. But altruistic activities can

make people feel good about themselves and can be a motivator. RPM is based on the fact that humans have evolved to be curious, problem-solving beings that avoid difficult or ineffective environments. Based on this he argues that people

- are motivated to know and understand what's going on; they hate being confused; and

- are motivated to learn discover and explore; and

- want to participate and play a role; they hate feeling helpless.

People that exhibit ERB are knowledgeable about environmental problems, are curious and feel competent. They also exhibit ERB when it does not seriously disadvantage them. (Kaplan 2000).

Gender has been linked to ERB (Zelezny, Chua, Aldrich, 2000). Zelezny et al found that women showed more environmentally responsible behavior than men. It is not fully understood why this is, but Zelezny et al. explain that women are shaped by gender expectations. Women are socialized to be more compassionate, nurturing, helpful and cooperative. Women exhibit more altruism.

These findings were similar to those of the Kentucky Environmental Education Council. The council found that Kentucky women were more likely to be concerned about the environment than men (KEEC, 2004).

ERB may not only be affected by individual characteristics but situational characteristics as well. The Hines Model of Responsible Environmental Behavior includes contributions from a person's

- personality factors measured by the individuals locus of control, attitudes and personal responsibility; and

- knowledge of issues; and

- knowledge of action strategies; and

- action skills.

Also in the model are intent to act and situational factors. Hines, Hungerford and Tomera conducted a meta-analysis of 128 studies and found intention to act to be the factor most closely related to ERB. Situational factors included in the Hines model may be economic constraints, social pressures and/or opportunities to choose different actions. These situational characteristics could strengthen or counteract other variables in the model (Hines 1986/87).

Based on the Hines model and subsequent research, Volk and Hungerford (1990) developed their own model of environmental citizenship behavior. They explain that there are three categories of variables that shape ERB. These include:

- Entry-level variables (environmental sensitivity, knowledge of ecology, androgyny and attitudes)

- Ownership variables (in-depth knowledge, personal investment, personal commitment)

- Empowerment variables (knowledge and use of skill, locus of control and intention to act)

The theory of ERB developed by Stewart Barr (Figure 1) incorporates environmental values, situational characteristics and psychological variables and seems to be a hybrid of the others described above. This model takes into account altruism, concern for the environment, influence of others (social pressures), self-interest motivation, and situational factors such as age, gender, income and education (Barr 2003).

Situational factors ————————▼

Environmental values ———▶ Behavioral intention ————————▶ Behavior

Psychological variable ————————▲
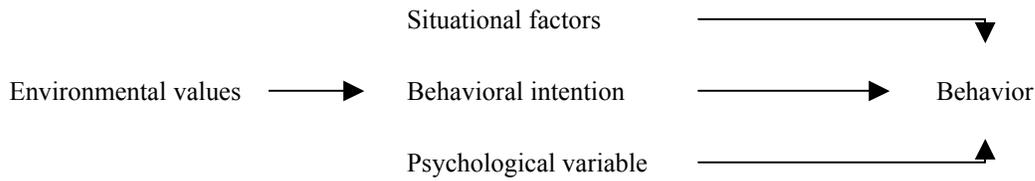
Figure 1: Barr's model of ERB

The models above indicate that ERB can be predicted by simple factors such as gender or more complex factors such as situational circumstances in conjunction with personality characteristics.

Environmental knowledge and attitudes are often compared to behavior because the theory is that the three are correlated (Hungerford and Volk, 1990). Kuhlemeier et al. (1999) tested this theory and did not find a correlation between knowledge and attitudes or knowledge and behavior. They did however find a correlation between attitudes and behavior. The Kentucky Environmental Education Council found that people who were more educated were more knowledgeable about the environment, but they did not report as many ERBs.

| **Knowledge** | ▶ | **Attitudes** | ▶ | **Behavior** |
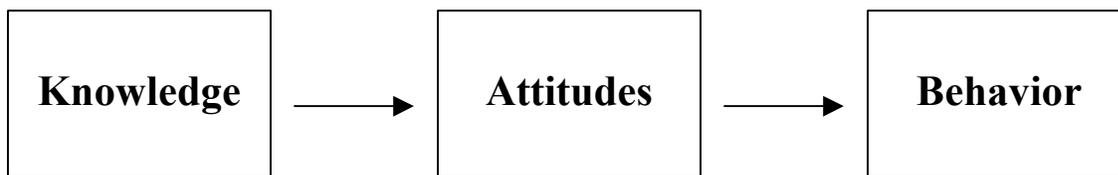
Figure 2: Basic model of ERB

The behavior model (Figure 2) (Hungerford and Volk, 1990). that knowledge affects attitudes which in turn affects behavior is a basic one. What is more likely is that knowledge in addition to values and interest shapes attitudes. This is the model used in this study along with measurement of some situational factors to determine the ERB of the local official population in Kentucky.

Understanding what drives sustainability at the local level

Starik and Rands define environmental sustainability as "the ability of one or more entities, either individually or collectively, to exist and flourish (either unchanged or in evolved forms) for lengthy time frames, in such a manner that the existence and flourishing of other collectivities of entities is permitted at related levels and in related systems." Many definitions exists but they basically say the same thing. Something is sustainable if it provides for people now and in the future.

Local sustainability efforts have not been studied as long as environmentally responsible behavior. Local Agenda 21, which charged local government with pursuing sustainability programs, was adopted in 1992. Some effort has been made by researchers to understand why some local governments adopt sustainability projects and others do not. It is not the purpose of this paper to advocate for adopting LA 21 practices. The purpose instead is to understand why certain communities adopt them.

Kent Portney (2002) studied 24 cities that had adopted sustainability programs to determine if there were common characteristics among the cities. Sustainability programs included smart growth activities such as brownfield redevelopment, land use and transportation planning programs, pollution prevention such as recycling, energy conservation and administration/coordination of sustainability projects.

Portney used regression analysis to determine if population size, population growth, land area and population density were correlated to sustainability efforts. He also looked at median family incomes, median house values, poverty rates, unemployment rates and per capita government spending. Portney also considered employment in manufacturing and service industries, African-American and Hispanic populations and age. Finally he looked at proportion

of population using public transportation, per capita government spending on environment, west coast verses east coast location and voting styles (republican or democrat).

Portney found that poverty is negatively correlated in bivariate analysis but not in multivariate analysis. He found median population age and number of manufacturing employees to correlate to sustainability programs. Percentage of population below the age of 18 and percentage of African Americans were negatively correlated to sustainability programs. Percentage of high school graduates was positively correlated to sustainability programs.

The only independent variables that remained significant in multivariate analysis were age of population and percentage of people employed in manufacturing jobs. Cities with older populations seemed to take sustainability more seriously and cities moving away from a heavy manufacturing base also seemed to take sustainability more seriously (Portney, 2002).

Lake examined 22 cities that had adopted Local Agenda 21 initiatives and found that all cities were second-tier cities or smaller. Second-tier cities are characterized as being distinct areas of economic activity where specialized industries establish themselves creating jobs and population growth. The cities were relatively homogenous in class and race. On average, the city residents had attained higher levels of education than the rest of the country and half the cities hosted a major university. Lake suggests that sustainability projects arise because there is a problem (cost of living, government inefficiency, pollution) that needs to be solved. This problem may not be an environmental one, but the solution benefits the environment. For example, public transportation may be created to alleviate congestion, but it also reduces air pollution (Lake, 2000).

While local governments have a role to play in the sustainability movement, some argue that it is businesses that should take the lead. The integration of environmental concern into

corporate practices has been gaining speed in the past decade as the long-term sustainability of businesses will depend on the sustainability of the environment. Manufacturers have the ability to create products that are more sustainable in nature thereby promoting the sustainability movement (Sarkis, 2001).

V.) Research Design

There are two questions that I plan to answer. First, how do local officials score in terms of environmental knowledge, attitudes and behavior and how do they compare to Kentuckians in general. Second do counties with judges who express more environmental responsibility, as measured by knowledge, attitudes and behavior, have more progressive environmental policies? This research is based on the theory that local officials who express greater knowledge of the environment and more positive attitudes and behavior towards the environment will promote stronger environmental policies. The research design I employed will not demonstrate a causal relationship because this design is not a longitudinal study. Instead, this research will show a correlation or lack of correlation between environmental responsibility of local officials and local environmental policies.

In order to answer these questions, I surveyed county judge executives in all 120 Kentucky counties and the mayors of Louisville and Lexington using an instrument developed by the Kentucky Environmental Education Council (KEEC). The Lexington and Louisville mayors were included because they oversee merged governments. Solid waste management data were used to represent indicators of local environmental progress. County judge executives have the potential to influence these indicators. For example, they can chose to fill a full-time solid waste coordinator position instead of the required part-time position. They can initiate curbside

recycling programs and encourage more litter enforcement actions. Therefore the county judge executive population and solid waste management data were used as proxies for local officials and environmental progress, respectively.

The KEEC instrument was developed to measure environmental knowledge, attitudes and behavior of Kentuckians and is based on a national survey conducted by Roper Starch Worldwide on behalf of the National Environmental Education and Training Foundation. This same survey was sent through the mail and follow-up e-mails were used to increase the response rate. Fifty-eight surveys were returned yielding a 48 percent response rate. One survey was discarded because it was completed by someone other than the addressee. A t-test was used to compare the respondents to nonrespondents.

The surveys measured environmental knowledge, attitudes and behavior of the respondents. Respondents received a score as a percent for knowledge, attitudes and behavior. For the knowledge questions, respondents received a point for each correct answer. A score of 50 percent meant the individual answered half the questions correctly. For the attitudes and behavior questions there were no right or wrong answers. Points were assigned to each possible answer on the attitude and behavior scales. Respondents were given points depending on the answer they selected. More points were given for answers associated with more concern or support for the environment or for answers that demonstrated more environmentally responsible behavior.

For example, a respondent who answered "strongly agree" to the statement that knowing about environmental problems was important to him or her received four points. Someone that only agreed with the question got three points. Points earned were divided by total points

possible to get a percentage. Knowledge, attitudes and behavior scores were compared to

Kentuckians' scores using a t-test.

I collected additional data by survey including age, median household income, education,

number in household, number of years as a county resident and number of years as a Kentucky

resident. The political affiliation of the individual and his or her number of service years were

collected from the Kentucky Association of County Judge/Executives Web site. A pairwise

correlation test was used to determine if there is a correlation between environmental

responsibility of the respondents and individual characteristics. The pairwise correlation test was

used because occasionally there were missing data in the data set. The pairwise correlation test

compares one variable to a single other variable. In this case missing data for one variable for a

respondent will not force the entire row of variables to be excluded. I also used multivariate

regression analysis.

In order to determine if environmental responsibility of local officials correlates to

environmental progress, additional data were collected to run a pairwise correlation test and to

conduct a multivariate analyses. Kentucky counties do not have specific sustainability projects

in effect to use as indicators of environmental progress, but there are several other factors that

can be used as indicators. Reliable data about the counties' waste management were readily

available in the *Statewide Solid Waste Management Report—2004 Update.* Presence of curbside

recycling, presence of mandatory trash pick-up, percent houses served by trash pick-up,

employment of a full-time solid waste coordinator and number of litter enforcement actions

taken were used as indicators of environmental progress in the analyses.

Presence of curbside recycling is not common in Kentucky counties. Of the 58 counties

included in this analysis, 11 reported curbside recycling for residents. In Kentucky, 36 counties

have mandatory trash pickup meaning residents must enroll in curbside trash pickup. Of the counties included in this analysis, 14 had mandatory trash pick-up.

Funding for county waste management was established in 2002 by the creation of the state Pride Fund. This program funds illegal dump, litter and abandoned landfill cleanup efforts. In order to be eligible for funds, each county must have at least a part-time solid waste coordinator to manage the programs. Funding full-time solid waste coordinator positions demonstrates additional commitment to solid waste issues. Twenty-eight of the 58 counties in the analysis had full-time solid waste coordinators (Kentucky Division of Waste Management, 2004).

Census data were collected on county characteristics including population density, median household income, percent population with a high school degree, and median age. These serve as controls in the multivariate model. The intention was to control for the fact that the people could be driving environmental progress at the local level, not the local officials and these county characteristics represent the people. Based on research by Portney (2002) and Lake (2000) age, percent manufacturing jobs, class and race makeup and education attainment level of citizens have correlated to sustainability.

Another control used was the presence of PRIDE (Personal Responsibility in a Desirable Environment) programs in the counties being analyzed. Congressmen Hal Rogers and Ben Chandler both have PRIDE programs in their districts. PRIDE funnels federal money to local governments to clean up illegal dumps and complete other environmental projects.

PRIDE affects the model in two ways. First, local officials in PRIDE regions could be more knowledgeable and concerned about the environment. Second, it could be PRIDE programs driving environmental progress. PRIDE is like a special interest group. There mission

is not to influence policy, but their grants, volunteer events and education programs could be having that effect.   Local officials do not decide whether or not their counties receive the grants, but the PRIDE programs could be generating grass roots efforts to instigate progressive environmental policies.

I tested four hypotheses. The first null hypothesis is that there is a difference between the local officials' and Kentuckians' environmental knowledge, attitudes and behavior. Second, there is a correlation between environmental knowledge, attitudes and behavior. Third, there is a correlation between environmental knowledge, attitudes and behavior and individual characteristics including, age, political affiliation, education, median household income, years of service, years in Kentucky and county of residence and number in household.

The final hypothesis is that there is a correlation between environmental responsibility of local officials and environmental progress. This research tests the theory that environmentally responsible local officials will produce more progressive environmental policies. This is based on the logic, that local officials who are knowledgeable about the environment will be more concerned and will take personal action. This action at a personal level will lead to action at the public level, thus creating more progressive policies.

Multiple assumptions are made to describe this logic. The first assumption is that education about the environment leads to more positive attitudes which lead to action. This also assumes that local officials that are environmentally responsible in their personal lives will carry that to their professional lives by bringing environmental issues to the forefront. Finally, this logic assumes that local officials are the key factor in raising environmental policies to the

decision making level and getting them adopted. These assumptions were tested with the analysis just described and are explained below.

VI.) Analysis and Findings

Fifty-eight local officials, all of which were county judge executives, responded to the survey. The respondents were predominately male. The median age was 57; the average number of people in respondents' households was between 2 and 3. Of the group, 19 percent had achieved some level of graduate school. Another 20 percent received a bachelor's degree. The rest of the group had achieved between a high school degree and a bachelors. Just over 50 percent of the respondents reported a household income of above $85,000. Twenty-two percent of the respondents reported a household income of between $75,000 and $85,000. The median household income for the group was over $85,000. The average time spent as a Kentucky resident and a resident of their county was 53 and 46 years, respectively. The median years served as county judge was 7. Of the respondents, 31 percent were listed as republicans and 69 percent as democrats.

Are local officials knowledgeable about the environment, do they express concern for the environment and exhibit environmentally responsible behavior? Are they different from other Kentuckians in terms of environmental knowledge, attitudes and behavior?

Thirteen questions were asked to measure the respondents' knowledge of a variety of environmental issues pertaining to water, air, land use, energy and waste. The average percent correct among the respondents is 78. The respondents were least knowledgeable about water pollution and most knowledgeable about hazardous waste. Only 47 percent could correctly define biodiversity, and just over half (54 percent) knew the primary danger of depletion of the

ozone layer. About two-thirds of the respondents correctly identified coal as the number one method of generating electricity in the U.S. This is higher than the 47 percent of Kentuckians that knew this.

Fifteen questions were used to measure respondents' attitude toward water and air quality, protection of natural areas including forests and wetlands, ozone layer depletion, environmental education and landowner rights. All of the judges believed environmental education should be taught in schools and 96 percent believed the state should spend more money on it. All of the respondents felt that you could have a healthy environment and a thriving economy, and 98 percent agreed that knowing about environmental problems was important to them.

Nine questions were used to gauge the local officials' behavior. The group was asked specific questions about their behavior as well as questions that measured their willingness to behave in certain ways. Eighty-seven percent of the respondents reported donating time and money to support environmental causes. Ninety-one percent indicated they buy products with less packaging. Nearly all the respondents (96 percent) indicated that they sometimes or frequently make an effort to reduce the amount of waste they produce, and 77 percent of the respondents reported that they recycle. Only 24 percent of respondents said that they sometimes or frequently plant trees.

When asked if they were willing to pay more for gas, electricity or heating oil if it meant protecting the environment, only 51 percent of the respondents that answered the question said yes. Eighty percent of respondents were willing to pay more for other products and services if it

meant protecting the environment. Figure 3 shows how much more respondents were willing to

pay for energy and other products.

Figure 3: Willingness to pay 5-20 percent more for energy and other costs
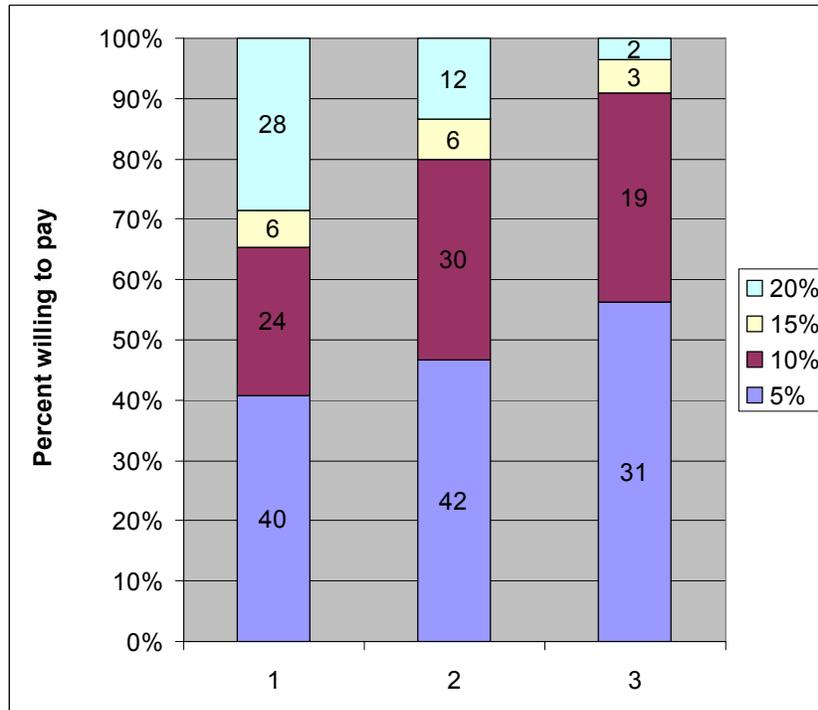
1. Willingness to pay more for energy (local officials)
2. Willingness to pay more for other products (local officials)
3. Kentuckians' willingness to pay more for other products (data was not available for willingness to pay more for energy costs)

The local officials' responses were compared to responses from Kentuckians in general.

Table 1 includes the questions in which there is a statistically significant difference (at the 95

level) between the local officials' responses and the Kentuckians' responses. For the first five

questions, the percent represents correct answers.

Table 1: Comparison between local officials and Kentuckians

Question	Officials	Kentuckians	P-value
What is the primary danger from ozone depletion?	54%	81%	0.005
What is the number 1 method of generating electricity?	67%	48%	0.004
What is the largest source of CO?	91%	61%	0.004
What is the primary cause of habitat loss?	95%	62%	0.029
What is the primary destination of household garbage in U.S.?	97%	76%	0.003
Rate the overall quality of air in Kentucky	86%*	40%*	1.00E-05
Reports donating time or money for the environment	87%	61%	0.004
Willingness to pay more for products/services	80%	63%	0.012

* Rated it as excellent or good

Are knowledge, attitudes and behavior correlated to each other or to other variables?

Pairwise correlation is a bivariate test that was used to determine if there is a correlation between knowledge, attitudes and behavior and various individual characteristics such as age, income, education, political affiliation and years of services as a county judge. Pairwise correlation was also used to determine if there is a correlation between knowledge attitudes and behavior. When pairwise correlation is used, the correlation coefficient is between -1 and 1. The closer to 1 or -1 the coefficient is, the more correlated two variables are. A positive coefficient means that as one variable increases so does the other. A negative coefficient means that as one variable increases the other decreases. The results of the test are in table 2 below.

Table 2: Pairwise correlation of knowledge, attitudes and behavior and individual characteristics of the respondents

```
        |        know    attit   behav    age   househ   educa   income
--------+-----------------------------------------------------------------
  know  |   1.0000
        |
        |
  attit |   0.0097   1.0000
        |   0.9426
        |
  behav |   0.3337   0.2470   1.0000
        |   0.0105*** 0.0616*
        |
   age  |   0.0713   0.2112   0.2888   1.0000
        |   0.6013   0.1181   0.0308**
```

```
            |
     househ |  -0.0629  -0.0042   0.0213  -0.4086   1.0000
            |   0.6388    0.9751   0.8737   0.0018***
            |
      educa |   0.3552   0.0558   0.2997   0.0552  -0.0827   1.0000
            |   0.0062*** 0.6771   0.0223** 0.6862   0.5369
            |
     income |   0.0943  -0.0069   0.2416   0.4269   0.0600   0.2007   1.0000
            |   0.4895    0.9599   0.0728*  0.0013*** 0.6603   0.1380
            |
     kentuc |  -0.0670   0.2304   0.1514   0.8536  -0.3119  -0.0946   0.3960
            |   0.6171    0.0819*  0.2565   0.0000*** 0.0171** 0.4800   0.0025***
            |
    county1 |   0.0152   0.1634   0.1041   0.5782  -0.1667  -0.2154   0.2312
            |   0.9101    0.2202   0.4368   0.0000*** 0.2110   0.1044   0.0865*
            |
      servi |   0.1592   0.1371   0.2432   0.1440   0.0562  -0.1121   0.0669
            |   0.2327    0.3049   0.0658*  0.2897   0.6750   0.4019   0.6240
            |
     affili |  -0.0547  -0.2673  -0.0276  -0.1342   0.1754   0.0975   0.0263
            |   0.6836    0.0425** 0.8369   0.3242   0.1878   0.4665   0.8472
            |
      pride |  -0.1166   0.0571   0.1661  -0.0964  -0.0386   0.1543   0.0000
            |   0.3834    0.6703   0.2127   0.4799   0.7733   0.2476   1.0000
            |

            |   kentuc  county1   servi   affili   pride
------------+---------------------------------------------
     kentuc |   1.0000
            |
            |
    county1 |   0.7038   1.0000
            |   0.0000***
            |
      servi |   0.2399   0.2945   1.0000
            |   0.0697*  0.0248**
            |
     affili |  -0.1477  -0.0493  -0.2647   1.0000
            |   0.2685    0.7130   0.0446**
            |
      pride |  -0.0272   0.0065  -0.1329   0.1925   1.0000
            |   0.8396    0.9614   0.3201   0.1476
```

P-values are in red. Abbreviations are defined in appendix A.
*** significant at the 99% confidence level
** significant at the 95% confidence level
* significant at the 90% confidence level

There is a weak positive correlation between knowledge and behavior (.33), which is

statistically significant at the 99 percent confidence level.   There is no correlation between

knowledge and attitudes. This suggests that knowledge matters in predicting environmentally

friendly behaviors, but not in predicting environmental attitudes. There is a weak positive

correlation between education and knowledge (.35) at the 99 percent confidence level. This is a

similar finding as that of the Kentucky Environmental Education Council's survey.

There is a weak positive correlation between attitude and behavior (.24), which is statistically significant at the 90 percent confidence level. There is also weak correlation between political affiliation and attitudes. To better understand this correlation a t-test was used. Democrats on average received 70 percent of the total points possible for attitude as compared to republicans who received 65 percent of the total possible points. This is statistically significant at the 95 percent confidence level. Democrats expressed more concern and/or more support for the environment.

There is a weak positive correlation between attitudes and years of residency in Kentucky (.23). Respondents who reported living in Kentucky longer also reported more positive attitudes towards the environment. It may be that over time people develop more ownership for the place in which they live and become more connected to it.

Multivariate regressions were used to better understand what affects knowledge, attitudes and behavior. In keeping with the theory that knowledge in addition to values and interests would shape attitudes which then shapes environmentally responsible behavior, three regression models were used.

1.) $Know = ageX + househX + educaX + incomeX + kentucX + county1X + serviX + affiliX + prideX + C$

Education continued to be positively correlated to environmental knowledge. A one unit increase in education increased knowledge by 1.73 points. This is significant at the 99 percent confidence level. A point was given to respondents for each level of education they received (see question 40 in Appendix B). Theoretically, this meant that going from a high school

graduate to some college increased the knowledge score by 1.73 points and increasing from

some college to an associates degree increased knowledge by another 1.73 points and so on.

Years of residency in Kentucky is inversely related to knowledge. A one unit increase in

residency decreased knowledge by .6 percentage points. This is significant at the 90 percent

confidence level.

```
      Source |       SS       df       MS              Number of obs =      54
-------------+------------------------------           F(  9,    44) =    1.75
       Model |  2617.8123       9  290.868033           Prob > F      =  0.1061
    Residual |  7314.74109     44  166.244116           R-squared     =  0.2636
-------------+------------------------------           Adj R-squared =  0.1129
       Total |  9932.55339     53  187.406668           Root MSE      =  12.894


------------------------------------------------------------------------------
       know2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         age |   .4365216   .3666826     1.19   0.240    -.3024786    1.175522
      househ |  -.2391334   2.242852    -0.11   0.916    -4.759305    4.281038
       educa |   1.736911   .6538062     2.66   0.011     .4192513    3.054571
      income |   .2757853   2.001944     0.14   0.891    -3.758868    4.310438
      kentuc |  -.6059752   .3476785    -1.74   0.088    -1.306675    .0947249
     county1 |   .2206277   .1830149     1.21   0.234    -.1482145     .58947
       servi |   .4374047   .3478098     1.26   0.215    -.2635599    1.138369
      affili |  -1.859815   4.125228    -0.45   0.654    -10.17367    6.454035
       pride |  -4.267088    3.79922    -1.12   0.267    -11.92391    3.389737
       _cons |   60.62056   16.01801     3.78   0.000     28.33838    92.90273
```

2.) Attit= knowX + ageX + househX + educaX + incomeX + kentucX + county1X + serviX + affiliX + prideX +C

    Political affiliation remained correlated to attitudes in the multivariate analysis at the .10

level. This correlation was explained on page 26.

```
      Source |       SS       df       MS              Number of obs =      54
-------------+------------------------------           F( 10,    43) =    0.85
       Model |  717.89595      10   71.789595           Prob > F      =  0.5854
    Residual |  3634.83024     43  84.5309359           R-squared     =  0.1649
-------------+------------------------------           Adj R-squared = -0.0293
```

```
     Total |   4352.7262    53  82.1269093                Root MSE      =   9.1941

-------------------------------------------------------------------------------
    attit2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----------+-------------------------------------------------------------------
     know2 |  -.0061747       .1075    -0.06   0.954    -.222969     .2106197
       age |   .1908595    .2656494     0.72   0.476    -.3448736    .7265926
    househ |   2.167698    1.599527     1.36   0.182    -1.058055    5.393451
     educa |   .3658501    .5022126     0.73   0.470    -.6469581    1.378658
    income |  -1.757088    1.427842    -1.23   0.225    -4.636607     1.12243
    kentuc |   .1225617     .256336     0.48   0.635    -.3943891    .6395124
   county1 |   .0073537    .1326408     0.06   0.956    -.2601421    .2748495
     servi |   .0533275    .2524322     0.21   0.834    -.4557505    .5624056
    affili |  -5.529016     2.94838    -1.88   0.068    -11.47499    .4169584
     pride |   2.228236    2.747686     0.81   0.422    -3.313001    7.769472
     _cons |   58.14416    13.15029     4.42   0.000     31.62407    84.66426
-------------------------------------------------------------------------------
```

3.) Behave= attitX + knowX + ageX + househX + educaX + incomeX + kentucX + county1X + serviX + affiliX + prideX +C

Age, number in household and years of service were correlated to behavior in the multivariate analysis. A one unit increase in age increased behavior by .73 points. This is significant at the 99 percent confidence level. A one unit increase in number in household increased behavior by 3.04 percentage points. This is significant at the 90 percent confidence level. Also significant at the 90 percent confidence level is years of service. A one unit increase in years of service increased behavior by .42 percentage points.

```
    Source |       SS        df       MS              Number of obs =      54
-----------+----------------------------------         F( 11,    42) =    2.62
     Model |  2369.87971     11   215.44361            Prob > F      =  0.0121
  Residual |  3450.21059     42  82.1478712            R-squared     =  0.4072
-----------+----------------------------------         Adj R-squared =  0.2519
     Total |   5820.0903     53  109.813025            Root MSE      =  9.0635

-------------------------------------------------------------------------------
    behav2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----------+-------------------------------------------------------------------
     know2 |   .1410118    .1059779     1.33   0.191    -.0728603    .3548839
    attit2 |   .1815282    .1503336     1.21   0.234    -.1218574    .4849137
       age |   .7253255    .2634452     2.75   0.009     .1936715     1.25698
    househ |   3.048258    1.610141     1.89   0.065    -.2011376    6.297654
     educa |   .3884178    .4981285     0.78   0.440    -.6168462    1.393682
    income |  -.0849466    1.432143    -0.06   0.953    -2.975128    2.805235
    kentuc |  -.3178059    .2533677    -1.25   0.217    -.8291227    .1935108
   county1 |  -.0308019    .1307625    -0.24   0.815    -.2946913    .2330874
```

```
   servi |    .4294796    .2489776     1.72    0.092    -.0729776    .9319368
   affili |   -1.149825    3.023039    -0.38    0.706    -7.250565    4.950914
    pride |    4.338668    2.729313     1.59    0.119    -1.169308    9.846644
    _cons |   -2.651467    15.63523    -0.17    0.866    -34.20464    28.90171
---------------------------------------------------------------------------
```

Do environmental knowledge, attitudes and behavior of local officials correlate to indicators of environmental progress at the local level?

The pairwise correlation test was first used to determine if there is a correlation between reported knowledge, attitudes and behavior of the local officials and indicators of local environmental progress.   Table 3 includes the results. P-values are in red.

Table 3: Pairwise correlation between knowledge, attitudes, behavior and indicators of local environmental progress

```
             |     know     attit     behav    pdensi    manufa      page     hisch
-------------+-------------------------------------------------------------------
       know  |   1.0000
             |
             |
       attit |   0.0097    1.0000
             |   0.9426
             |
       behav |   0.3337    0.2470    1.0000
             |   0.0105**  0.0616*
             |
      pdensi |  -0.0517    0.2048    0.0622    1.0000
             |   0.7000    0.1230    0.6426
             |     know     attit     behav    pdensi    manufa      page     hisch

 -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

      manufa |  -0.0541   -0.0189   -0.0947    0.0640    1.0000
             |   0.7434    0.9091    0.5662    0.6987
             |
        page |  -0.0403   -0.1034   -0.0675   -0.0452    0.0958    1.0000
             |   0.7638    0.4400    0.6148    0.7359    0.5620
             |
       hisch |   0.1838    0.2473    0.0509    0.3256    0.2023   -0.0550    1.0000
             |   0.1673    0.0612*   0.7043    0.0126*** 0.2167    0.6817
             |
      income |   0.1060    0.1929    0.0436    0.3112    0.2074   -0.0220    0.8787
             |   0.4286    0.1469    0.7452    0.0174**  0.2051    0.8701    0.0000***
             |
       pride |  -0.0815    0.0567    0.2176   -0.0717   -0.2208   -0.1833   -0.3749
             |   0.5431    0.6726    0.1008*   0.5928    0.1767    0.1684    0.0037***
             |
       manda |  -0.0061    0.1015   -0.0022   -0.0598   -0.2082   -0.1105   -0.1854
             |   0.9640    0.4482    0.9871    0.6554    0.2034    0.4090    0.1635
             |
```

	income	pride	manda	houser	curbs	enforc	swcft
houser	0.1102	0.1006	0.1163	0.2555	0.1834	-0.1397	0.2349
	0.4103	0.4526	0.3847	0.0529**	0.2638	0.2955	0.0759*
curbs	-0.2493	0.2276	0.0914	0.3774	0.0819	-0.1692	0.3665
	0.0591*	0.0857*	0.4951	0.0035***	0.6200	0.2042	0.0047***
enforc	-0.0252	0.2223	0.1530	0.9001	0.0481	-0.0697	0.1676
	0.8510	0.0936*	0.2515	0.0000***	0.7711	0.6033	0.2087
swcft	0.3529	0.1674	0.2733	0.2065	-0.0796	-0.2925	0.2808
	0.0066***	0.2092	0.0379**	0.1198	0.6298	0.0259**	0.0328**

	income	pride	manda	houser	curbs	enforc	swcft
income	1.0000						
pride	-0.3273	1.0000					
	0.0121***						
manda	-0.2259	0.2233	1.0000				
	0.0881*	0.0919*					
houser	0.2870	0.0610	0.3522	1.0000			
	0.0289	0.6490	0.0067***				
curbs	0.4275	0.1657	0.0354	0.3358	1.0000		
	0.0008***	0.2140	0.7917	0.0100***			
enforc	0.1897	0.0246	0.0380	0.2246	0.3422	1.0000	
	0.1537	0.8546	0.7771	0.0901*	0.0086***		
swcft	0.2125	-0.0441	0.1001	0.1989	0.2367	0.1623	1.0000
	0.1093	0.7422	0.4547	0.1345	0.0736*	0.2236	

Abbreviations are defined in Appendix A
*** statistically significant at the 99 percent confidence level
** statistically significant at the 95 percent confidence level
* statistically significant at the 90 percent confidence level

There is a positive correlation (.35) between knowledge and the employment of a full-time solid waste coordinator, which is significant at the 99 percent confidence level. But there is a negative correlation (-.24) between knowledge and curbside recycling suggesting that less knowledge is correlated to greater likelihood of having curbside recycling.

There are weak correlations between attitudes and presence of curbside recycling (.22) and number of enforcement actions (.22). Both are significant at the 90 percent confidence level.

There is also a weak positive correlation between reported behavior of respondents and employment of a full-time solid waste coordinator (.27). This is significant at the 95 percent confidence level.

A multivariate regression was used to determine if the correlation between the knowledge, attitudes and behavior reported by local officials and indicators of local environmental progress remained when other variables were controlled for. Several models were run using mandatory trash pickup, percent houses served by trash pickup, presence of curbside recycling, employment of a full-time solid waste coordinator and number of enforcement actions taken against people that litter as dependent variables. If knowledge attitudes and behavior showed a correlation to the dependent variables in the pairwise analysis then they were used as independent variables. County characteristic variables were used as controls whenever they showed a correlation in the pairwise analysis.

Curbside recycling: Curbs= knowX + attitX + pdensiX + hischX + incomeX + houserX + c

Knowledge remained a significant correlate of curbside recycling at the 95 percent confidence level. However, it is inversely related to curbside recycling. As knowledge increases, likelihood of curbside recycling declines. This could be that people apply knowledge in different ways. A republican with knowledge of waste problems may utilize a different strategy for solving the problem than a democrat with the same knowledge. Also, recycling is a volume-based business. Lack of infrastructure in rural counties can reduce volume making recycling less economical. Therefore it is not surprising that population density remains correlated to curbside recycling in multivariate analysis. As population density increases, the

likelihood of curbside recycling also increases. This is significant at the 95 percent confidence

level.

Median household income is also correlated to curbside recycling at the 90 percent

confidence level. As median household income increases so does the likelihood of having

curbside recycling.

```
Logistic regression                              Number of obs   =         58
                                                 LR chi2(6)      =      32.90
                                                 Prob > chi2     =     0.0000
Log likelihood = -11.723702                      Pseudo R2       =     0.5839

      curbs |      Coef.    Std. Err.      z    P>|z|     [95% Conf. Interval]
------------+----------------------------------------------------------------
       know | -15.25492    7.142284    -2.14   0.033    -29.25354   -1.256303
      attit |  9.331245    6.721511     1.39   0.165    -3.842675    22.50516
     pdensi |  .0395837    .0177201     2.23   0.025     .0048529    .0743145
      hisch | -16.79439    14.37296    -1.17   0.243    -44.96488    11.37609
     houser |  4.469647    4.957204     0.90   0.367    -5.246294    14.18559
     income |  .4144309     .231071     1.79   0.073    -.0384599    .8673217
       cons |  -6.42878     6.14583    -1.05   0.296    -18.47439    5.616825
```

Enforcement: Enforce= attitX + pdensiX + houserX + curbsX +c

Population density remained the only predictor of litter enforcement actions. A one unit

increase in population density increases enforcement actions by .83 units.   This is significant at

the 99 percent confidence level.

```
    Source |       SS       df       MS              Number of obs =      58
-----------+------------------------------           F(  4,    53) =   57.16
     Model | 2157283.75      4  539320.937           Prob > F      =  0.0000
  Residual | 500038.319     53  9434.68527           R-squared     =  0.8118
-----------+------------------------------           Adj R-squared =  0.7976
     Total | 2657322.07     57  46619.6854           Root MSE      =  97.132

------------------------------------------------------------------------------
    enforc |      Coef.    Std. Err.      t    P>|t|     [95% Conf. Interval]
-----------+------------------------------------------------------------------
     attit |  98.40358    150.9013     0.65   0.517    -204.2662    401.0733
```

```
      pdensi |   .8316968    .0609982    13.63   0.000     .7093499    .9540438
      houser |  -10.27745    89.63115    -0.11   0.909    -190.0548    169.4999
       curbs |  -1.166177    36.92386    -0.03   0.975    -75.22606    72.89371
       _cons |   -59.7459    122.4401    -0.49   0.628    -305.3296    185.8378
------------------------------------------------------------------------------
```

<u>Full-time solid waste coordinator</u>: swcft = knowX + behavX + pageX + hischX + curbsX + c

Knowledge continued to be a predictor of employment of a full-time solid waste
coordinator. As knowledge increases so does the likelihood of having a full-time solid waste
coordinator. This is significant at the 95 percent confidence level. Also as population age
increases, the likelihood of employment of a full-time solid waste coordinator decreases. This is
also significant at the 95 percent confidence level. Finally, the presence of curbside recycling
increases the likelihood of having a full-time solid waste coordinator. This is significant at the
90 percent confidence level.

```
Logistic regression                             Number of obs   =         58
                                                LR chi2(5)      =      21.63
                                                Prob > chi2     =     0.0006
Log likelihood = -29.354507                     Pseudo R2       =     0.2692

------------------------------------------------------------------------------
       swcft |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        know |   8.616719    3.56439     2.42   0.016     1.630643    15.60279
       behav |   3.178428   3.267114     0.97   0.331    -3.224997    9.581853
        page |  -.2547324    .153513    -1.66   0.097    -.5556123    .0461475
       hisch |    2.19338   3.573805     0.61   0.539     -4.81115     9.19791
       curbs |   2.053407   1.116976     1.84   0.066     -.135827     4.24264
       _cons |  -.9664157   6.111275    -0.16   0.874    -12.94429    11.01146
```
<u>Mandatory trash pickup/houses served by trash pickup</u>: knowledge, attitudes and
behavior did not correlate to these variables in bivariate or multivariate analysis.

VII.) Discussion and Recommendations

What drives environmentally responsible behavior at the individual level has been studied for decades and will continue to be the topic of research. What drives environmentally responsible policies at the local level is a newer topic of study. The pursuit of sustainability is in the hand of local officials and citizens. Local Agenda 21 clearly explains that local governments and local officials play a pivotal role. Their proximity to the people and the environmental problems position them to develop innovative solutions to environmental problems that can be accepted by the people.

Based on the analysis of the population studied, local officials are knowledgeable about the environment. The average respondent received a passing grade of 78 percent on the environmental knowledge quiz. The respondents reported less concern toward the environment than Kentuckians for one topic, but otherwise were similar to Kentuckians. The respondents all agreed that a healthy environment and a healthy economy were not mutually exclusive. Respondents also reported some environmentally responsible behavior and a willingness to do more.

While environmental responsibility of local officials does correlate to some indicators of environmental progress at the local level, this study did have limitations that if addressed could alter results. The survey yielded a response rate of 48 percent. It is possible that those who are more interested in the environment chose to fill out the survey. Since the surveys were mailed, it is also possible that they were completed by someone other than the addressee.

This sample size made it difficult to get a random sample. A t-test was used to compare the nonrespondents and their counties to the respondents and their counties. There is no statistically significant difference in the population densities of the respondents' and the nonrespondents' counties. There is no statistically significant difference between respondents'

and nonrespondents' affiliation and years of service. There is also not a statistically significant difference between median household income, average high school attainment level and median age between the respondents and nonrespondents' constituents. There is no variation between the respondents and nonrespondents and their counties based on these variables.

Another limitation of this study is that it used county judge executives as the subpopulation representing the entire population of local officials. Had the entire population of local officials been included in the survey, results could have varied. It is unknown if county judge executives' environmental knowledge, attitudes and behaviors are similar to those of other local officials such as magistrates, mayors and city council members. Administrators in government may also play a role in advancing environmental policies.

The independent variables could have been limiting factors. Some programs such as curbside recycling could have preceded the current judge who filled out the survey. Other variables such as enforcement actions and employment of a full-time solid waste coordinator may be more indicative of the work of the current officials who were included in this study.

Recommendations:

- **Conduct additional research to include more local officials in the study**

Additional research is needed to fully understand environmental knowledge, attitudes and behavior of local officials in general. Data should be gathered from local officials including other county officials and city officials. Local government administrators should also be included as they may have a role to play in advancing environmental policies.

- **Conduct additional research to better understand socioeconomic characteristics and indicators of urbanization as factors that contribute to local environmental policies.**

As Lake (2000) explains, sustainability comes about because there is some problem that needs to be solved—transportation problems in a growing city, expensive trash pickup or excessive litter. In this study indicators of urbanization tended to correlate with indicators of environmental progress at the local level. Houses served by trash pickup (.25)[**], presence of curbside recycling (.37)[***] and enforcement of litter laws (.90)[***] were positively correlated to population density.

Houses served by trash pickup (.23)[*] and presence of curbside recycling (.36)[***] were positively correlated to percentage of citizens with at least a high school degree. By better understanding the effect of urbanization and socioeconomic factors of citizens, environmental educators can target their outreach to local officials in communities that are more likely to adopt stronger environmental policies.

- **Local officials need to be aware of their role in sustainability efforts.**

This recommendation is based on the literature review not the analysis performed in this study. According to Local Agenda 21, local officials must take leadership roles in creating more sustainable communities. When grappling with problems in their communities, local officials should be knowledgeable about innovative strategies that can solve problems and create a healthier environment. As noted by Lake (2000), sustainability programs and projects often arise because there is a problem that needs to be solved and the solution implemented has social and environmental benefits.

Local officials are needed to be leaders in local sustainability efforts. According to Krueger and Agyeman (2005), "The triggers to local sustainability exist in probably every city in the

U.S., all it needs, if "all" is the right word is political vision. Look at any city (with sustainable programs) in the world… and there is a courageous mayor."

However, special interest groups and businesses also play an important role in promoting sustainability efforts. Since the creation of Local Agenda 21, the most common action taken by local governments is the establishment of stakeholder planning forums. The purpose of these forums is to educate the public, provide an institutional voice, and create the local capacity to negotiate agreements between competing interests (Brugmann, 1996). Local officials may not always take a leadership role in progressing sustainability efforts, but they will still be involved through the development and advancement of policies that support sustainability. Either as leaders or as followers, local officials have a role to play in environmental progress.

References

Barr, S. (2003). Strategies for sustainability: citizens and responsible environmental behavior. *Area*. 35.3, pp. 227-240.

Brugman, J. (1996). .Planning for sustainability at the local government level. *Environmental Impact Assessment Review*, 16, pp. 363-379.

Carroll, Jon (2005) Fasten Your Seatbelts: the Rapture Index. *San Francisco Chronicle*. Feb. 11.

Corbett, J. (2005). Altruism, self-interest and the Reasonable Person Model of environmentally responsible behavior. *Science Communication*, Vol. 26 No. 4, pp. 368-389.

De Young, R. (2000). Expanding and evaluating motives for environmentally responsible Behavior. *Journal of Social Issues*, Vol. 56, No. 3, 2000, pp. 509-526.

Eckberg, D. and T. Jean Blocker (1989) Varieties of Religious Involvement and Environmetnal Concerns: Testing the Lynn White Thesis. *Journal of Scientific Study of Religion*. Vol. 28, No. 4, pp. 509-517.

Eller, J. Executive Director, Kentucky Environmental Education Council. Interview Feb. 15, 2006.

Hand, C and Kent Van Liere (1984) Religion, Mastery-Over-Nature and Environmental Concern. *Social Forces*. Vol. 63, No. 2, pp. 555-570.

Hungerford, H & Volk, T. (1990). Changing learner behavior through environmental education. World Conference on Education for All—Meeting Basic Learning Needs

Hines, J.M., et al. (1986/87). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. Journal of Environmental Education 18(2): pp. 1-8.

Kaplan, S. (2000). Human nature and environmentally responsible behavior. *Journal of Social Issues,* Vol. 56, No. 3, 2000, pp. 491-508.

Kentucky Division of Waste Management (2004) Statewide Solid Waste Management Report—2004 Update. www.waste.ky.gov.

Kentucky Environmental Quality Commission (1993). "Local Officials Guide to Kentucky's Environment."

Krueger, R. & Agyeman, J. (2005). Sustainability schizophrenia or "actually existing sustainabilities?" toward a broader understanding of the politics and promise of local sustainability in the US. *Geoforum*, Vol. 36, Issue 4, pp. 410-417.

Kuhlemeier, H., Bergh, H., Lagerweij, N. (1999). Environmental knowledge, attitudes and behavior in Dutch secondary education. *Journal of Environmental Education*. Vol. 30, Issue 2.

Lake, R. (2000). Contradictions at the local state: Local implications of the US sustainability agenda in the USA. In: N. Low et al., Editors, *Consuming Cities*: The Urban Environment in the Global Economy After the Rio Declaration, Routledge, London.

Local Agenda 21. UN Department of Economic and Social Affairs: Division for Sustainable Development, http://www.un.org/esa/sustdev/documents/agenda21/english/agenda21toc.htm. Accessed 3/01/2006.

Portney, K. (2002). Taking sustainable cities seriously: a comparative analysis of twenty-four US cities. *Local Environment*, Vol. 7, No. 4, pp. 363-380.

Sanera, Michael. (1998) Environmental Education: Promise and Performance. *Canadian Journal of Environmental Education*. 3, 9-26.

Sarkis, J (2001) Manufacturing's role in corporate environmental sustainability. *International Journal of Operation & Production Management*. Vol. 21 No. 5/6, pp. 666-6686

Schwartz, S.H. (1977). Normative influences on altruism. In *Advances in Experimental Social Psychology*, Vol. 10, pp. 221-279.

Starik, M and Gordon Rands (1995) Weaving an Integrated Web: Multilevel and Multisystem Perspectives of Ecologically Sustainable Organizations. *The Academy of Management Review*. Vol. 20, No. 4, pp. 908-935

Survey of Environmental Knowledge Attitudes and Behavior. Kentucky Environmental Education Council. www.keec.ky.gov. Accessed February 15, 2006.

UNESCO/UNEP (1978) The Tbilisi Declaration. *Connect*. 3(1), 1-8.

United States Census. www.census.gov Accessed Feb. 16, 2006.

University of Louisville (2004) The Partnership Project: Partnership for a Green City. www.jefferson.k12.ky.us/departments/EnvironmentalEd/GreenCity/GreenCity.html.

White, L. (1967) The Historical Roots of Our Ecological Crisis. *Science* 155:1203-07.

Zelezny, L., Chua, P. & Aldrich, C. (2000). Elaborating on gender differences in environmentalism. *Journal of Social Issues,* Vol. 56, No. 3, 2000, pp. 443-457.

Appendix A: Definition of variables

Know= knowledge: this represents the percentage score given to respondents based on their number of correct answers. Know2 is the name given to a generated variable that converted knowledge to percent. (Know=.78; know2=78)

Attit= attitude: this represents the percentage score given to respondents. It is their total points earned on the attitude portion of the survey divided by the total points possible. Attit2 is the name given to a generated variable that converted knowledge to percent. (attit=.78; attit2=78)

Behav= behavior: this represents the percentage score given to respondents. It is their total points earned on the behavior portion of the survey divided by the total points possible. Behav2 is the name given to a generated variable that converted knowledge to percent. (behav=.78; behav2=78)

Respondent characteristics

Age= age of the survey respondents

Househ= number in the household of the survey respondent

Educa= education attainment level of the survey respondent

Income= median household income of the survey respondent

Kentuc= years of residency in Kentucky of the survey respondent

County1= years of residency in the county the survey respondents serve

Servi= years of service as county judge executive

Affili= political affiliation of survey respondent (democrat/republican)

County characteristics

Pride= whether or not the survey respondent represents a county in a PRIDE service area

Pdensi= population density of the county served by respondent

Page= median population age of the county residents

Hisch= percentage of county residents that obtained a high school degree

Income2= median household income of county residents

Indicators of environmental progress

Manda= presence of mandatory trash pickup (1=presence; 0=no presence)

Houser= percent houses served by trash pickup

Curbs= presence of curbside recycling (1=presence; 0=no presence)

Enforce= number of litter violation enforcement actions
Swcft= employment of full-time solid waste coordinator (1=employment; 0=no employment)