

*This study utilized the theory of planned behavior, a model of attitudinal factors related to behavioral intention, to investigate the lack of participation in government-sponsored programs to conserve riparian areas. A telephone survey of 209 rural landowners whose property abutted a waterway revealed that financial motivations, past behaviors, exposure to government information, and self-efficacy predicted 29 percent of the variance in intent to participate in future conservation programs. The findings suggest that external constraints and social barriers (such as financial variables) are important moderators of perceived behavioral control and deserve closer scrutiny.*

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## ***Motivations to Participate in Riparian Improvement Programs***

*Applying the Theory of Planned Behavior*

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*Waterways in the arid West* are valuable ribbons of public real estate. When these waters flow through privately owned land, they provide great benefit to the landowner, often in the form of water for livestock or crops. However, heavy use of the riparian zone—the interface area between the waterway and land—can collapse streambanks, increase erosion and flooding, send

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sediment and chemicals into the waterway, increase stream temperatures, and destroy fish and wildlife habitat. Two government agencies have programs to improve the quality of riparian areas, but participation by private landowners has been very poor. Like many communicators, representatives from the agencies would benefit from understanding the attitude and knowledge factors related to the lack of participation.

A theoretical model used frequently to identify attitudinal factors related to behavior is the theory of planned behavior (Ajzen 1991). The model has been successful in predicting a variety of health-related behavior changes, including exercise, smoking, diet, cancer screening, alcohol consumption, and AIDS prevention (Armitage and Conner 1999; Brenes, Strube, and Storandt 1998; Conner, Warren, and Close 1999; Hu and Lanese 1998; Sheeran and Orbell 2000; Smith and Stasson 2000). The model also has been used increasingly to predict various environmental behaviors, such as recycling, antinuclear activism, and water conservation (Boldero 1995; Chan 1998; Cheung, Chan, and Wong 1999; Fox-Cardamone, Hinkle, and Hogue 2000; Lam 1999; Trumbo and O'Keefe 2000). The theory of planned behavior (TPB) has warranted special journal issues and received worldwide empirical testing, resulting in meta-analyses (Sutton 1998) and attempts to expand the theory by incorporating additional independent variables (Conner and Armitage 1998), including media and information variables (Griffin, Dunwoody, and Neuwirth 1999; Trumbo and O'Keefe 2000).

With decades of theoretical refinement and testing, the theory has been successful in predicting behavior in a variety of contexts and with increasing specificity. Therefore, the objective of this study was to test the utility of the TPB in this applied research problem. Because the TPB investigates attitudinal factors related to behavior, applying the theory to this problem would allow agency representatives to understand what attitudes are linked to the lack of participation in their programs and work to address them.

### ***Background***

Properly vegetated land adjacent to streams and rivers (called riparian areas) is critical for wildlife habitat, fisheries, and water quality. In Utah, a significant portion of riparian area land is in the care of rural private landowners, and a significant portion of that land is degraded and in need of rehabilitation and restoration (Nichols 2000). For example, if livestock are allowed access to the waterway, streambanks collapse, which increases sediments and stream temperatures. If streambanks lose their natural vegetation from livestock grazing or agriculture, they lose their value as habitat and become

unstable, increasing erosion and the potential for flooding. Although there are several government conservation programs to help landowners correct these conditions (such as money to fence livestock away from streams), few landowners in the state have participated.

The Utah Association of Conservation Districts represents 39 soil conservation districts in the state, districts that are local units of government responsible for soil and water conservation work in their areas. Each district works to increase voluntary conservation practices among farmers, ranchers, and other land users. The Natural Resources Conservation Service (NRCS), a federal agency formerly called the Soil Conservation Service, works with landowners to voluntarily protect and enhance soil, water, and other resources. With money from federally funded programs, NRCS provides financial and technical assistance to private landowners for on-the-ground conservation practices. Requirements for the various programs differ, but key provisions include cost-sharing arrangements for materials and installation and per-acre rental payments. Typical actions under these programs include fencing, planting vegetation for long-term cover, and installing erosion control devices.

Although riparian areas serve vital functions in all parts of the country, their value in the arid West is heightened. Utah is one of the driest states in the nation, making its public waterways extremely important as a habitat for fish and wildlife and as a source of pure water.

### ***Theoretical Framework***

The relationship between attitudes and behaviors has been of interest to scholars for decades. In the 1960s, Fishbein (1967) investigated the psychological processes by which attitudes cause behavior. In the 1970s, Fishbein and Ajzen (1975) developed the theory of reasoned action, a parsimonious model which held that a person's intent to behave in a certain way was largely a function of the person's attitude toward the act (his or her positive or negative evaluation of performing the behavior) and social norms (the person's perception of social pressures to perform or conform to the behavior). The theory also suggests that a person's intention to perform a behavior is strongly related to the behavior itself, if both are measured at the same level of specificity and within a short time frame.

Because the theory of reasoned action treats behavior as solely under the control of intention, it is most appropriately restricted to volitional behavior (Conner and Armitage 1998) and may poorly predict behaviors requiring skills or resources outside an individual's control (Fishbein 1993). Hence, the

TPB extends the theory of reasoned action by incorporating a third independent variable, perceived behavioral control, or the extent to which performing the behavior is considered to be easy or difficult. Both internal and external control factors can be relevant to behavior. For example, an internal factor may be inadequate knowledge of how to conserve water or where to take recycling. External factors may be barriers or constraints to performing the behavior that lie outside the control of the individual, such as the cost of mammography screening, or in this case, the cost of fencing. The TPB maintains that the greater the perceived control one has over a behavior, the stronger the person's intention to perform that behavior.

Scholars have suggested that numerous additional independent variables be included in the TPB to better account for the range of conditions and contexts in research settings. As Ajzen (1991) noted:

The theory is, in principle, open to the inclusion of additional predictors if it can be shown that they capture a significant proportion of the variance in intention or behavior after the theory's current variables have been taken into account. (P. 199)

Conner and Armitage (1998) argued that "a theoretical description of the role of additional variables . . . is required if a theoretically coherent model is to result" (p. 1433). In this study, an argument of theoretical sufficiency can be made to test the additional variables of past behavior, moral norms, self-efficacy, information variables, and financial factors linked to behavioral control.

Although past behavior does not cause subsequent behavior, frequent or repeated performance may help turn the behavior into a habit. Several studies have concluded that for habitual acts such as recycling, past recycling may play a dominant role in predicting subsequent behavior (Boldero 1995; Chan 1998; Cheung, Chan, and Wong 1999). Others have argued that when a behavior becomes habitual, a person may be more likely to use simplified decision rules and to use the past behavior almost as a source of information (Verplanken, Aarts, and van Knippenberg 1997); information possessed because of past behavior is then capable of being automatically activated by the context in which the behavior occurs (Bargh 1990). In this research setting, past actions by landowners to protect their riparian area, whether undertaken individually or through a sponsored program, should provide a valuable indication of the commitment to protect the area and is a likely predictor of future protection.

People intend to engage in behaviors for which they possess self-efficacy or feel they are capable. Some researchers have separated self-efficacy from

perceived behavioral control because of the latter's focus on beliefs about control (internal or external) and the former's focus on beliefs about capabilities (Armitage 1997; Dziewaltowski, Noble, and Shaw 1990; Terry and O'Leary 1995). Researchers investigating environmental behaviors (Trumbo and O'Keefe 2000) have defined self-efficacy as the belief that an individual's actions make a difference in overall environmental quality (i.e., "Conserving water in my home makes a difference in my community"). In contrast, perceived internal control over a behavior refers to beliefs in one's ability to possess or obtain necessary resources or knowledge (i.e., "I know how to recycle"), while external controls refer to one's perceptions about the influence or constraints of external factors on individual behavior (i.e., "The city recycling drop-off center is too far away for me to use").

It is reasonable to assume that some individuals also may feel moral responsibilities toward environmental behaviors that go beyond perceptions of self-efficacy and control and beyond the social pressures applied by neighbors and friends. Moral norms are a person's perception of the moral correctness or incorrectness of performing a behavior or having personal feelings of a responsibility to perform (Ajzen 1991). Moral norms provide an imperative beyond social values and have been found to affect intention (Conner and Armitage 1998). Harland, Staats, and Wilke (1999) tested "personal norms" as an additional independent variable, a conceptualization that combined environmental values and moral norms, and found that its addition increased predicted variance.

Some researchers have argued for the addition of information variables such as the degree of information seeking, information processing, or exposure to information as important links to behavior and behavioral intention (Griffin, Dunwoody, and Neuwirth 1999). Trumbo and O'Keefe (2000) found that information effects (information seeking, exposure, and attention) were strong predictors of both attitudes and norms, and all three variables covaried to predict intention to conserve water. Chan (1998) argued that mass media information was a major source of influence in the establishment of social norms. In this study, landowners who have been exposed to or sought out information about riparian areas may be more likely to participate in a riparian-related program.

Finally, past research has noted the importance of financial capability as an aspect of behavioral control for farmers' intentions toward water-saving technology (Lynne et al. 1995). Because the government-sponsored riparian programs involve some cost-sharing measures, financial capability and financial motivations may prove important predictors of behavioral intention.

### ***Research Objectives***

The objective of this study was to test the application of the TPB on a specific target audience (Utah rural landowners whose property abuts waterways) and a specific behavioral intention (participation in a government-sponsored riparian program). Like some past research that tested the TPB (Hu and Lanese 1998; Lam 1999; Smith and Stasson 2000; Trumbo and O'Keefe 2000), this study did not measure actual behavior at a later date; low participation is the problem the agencies currently face and hope to ameliorate with an information campaign. While it is acknowledged that intentions often bear a close relationship to subsequent behavior, scholars also have pointed out that behavioral intentions do not perfectly predict behavior; in fact, according to meta-analyses by van den Putte (1991), intentions may account for only 38 percent of the variance in behavior. Therefore, it is not considered a weakness in this study that a behavioral measure was not included.

In addition to testing for the standard variables of the TPB (attitude toward act, social norms, perceived behavioral control, and behavioral intention), this study tested for additional variables judged pertinent to the audience and context here: environmental attitudes, moral norms, self-efficacy, knowledge, information seeking and exposure, past behaviors, and cost and financial motivation factors.

Based on the literature and on the particular research setting, this study poses one primary research question: Which of the independent variables of the TPB best predict intention to participate in a government-sponsored riparian program? This is phrased as a question rather than a hypothesis for several reasons. First, this was an applied research project that would enable the clients to develop an information campaign based on the best predictors of intention to participate. As Sutton (1998) carefully explained, "If the main aim [for utilizing TPB variables] is to develop a predictive model, we do not need to concern ourselves . . . with specifying causal processes" (p. 1319). Sutton acknowledged that while the TPB can be considered a causal model when used with path diagrams or mathematical equations, researchers may at times want to maximize predictive power to better target interventions.

Second, much of the past research utilizing the TPB for environmental behaviors involves widely defined or generalized behavior, such as recycling, water conservation, or leisure choices (Ajzen and Driver 1992). The target behavior here is both narrowly defined and, although voluntary, represents a monetary and more significant commitment.

Third, the target population is rural. As demonstrated by numerous researchers, rural homogeneous communities differ significantly from their

heterogeneous urban counterparts in the way that information and conflicts are processed and decisions made (Corbett 1992; Hindman 1996; Olien, Donohue, and Tichenor 1995). Past research using the TPB for environmental behaviors has tended to rely on urban samples (Boldero 1995; Chan 1998), communities of varying size (Trumbo and O'Keefe 2000), or the ubiquitous sample of college students (Ajzen and Driver 1992; Cheung, Chan, and Wong 1999). It may be that particular variables, such as environmental attitudes or social norms, play different roles in rural areas where the majority of landowners are involved with natural resources on a daily basis. In addition, riparian areas are a unique interface between private property and a public waterway, which may influence the perceived behavioral control of rural landowners over their property.

### *Method*

This research was conducted as part of a senior-level communication research course that was taught as "service learning," a pedagogy designed to link classroom learning with the research needs of community and regional nonprofit organizations (Corbett and Kendall 1999). A telephone survey was considered an efficient method of gathering the data, considering the limited time frame of the semester and the course objective to train students in a variety of research techniques, such as interviewing.

The target population was individual landowners whose private property adjoined a river, stream, or natural waterway and who would therefore be eligible to participate in a government-sponsored riparian improvement program. Because many waterways are surrounded by state or federal land, focus was given to watersheds containing significant amounts of private land. Construction of the sampling frame was coordinated by the Utah Association of Conservation Districts. They contacted field agents with a variety of state and federal resource agencies and a university extension service to obtain copies of appropriate mailing lists and databases. All collected names with complete addresses and phone numbers were used; no sampling was performed. The compiled list could be considered a census of private landowners along many watersheds, particularly in the northern and central parts of the state.

The survey instrument consisted of fifty-three questions, designed to test numerous variables linked to the theory of planned behavior and to elicit information valuable to the agencies. As a pretest for comprehension and length of the survey instrument, representatives from each agency reviewed

the survey for accuracy and provided phone numbers of several individuals (who lived in a watershed that was not sampled) who could be interviewed.

### *Measurement*

Table 1 lists variables of the TPB and their operationalization. Because of the time constraints of telephone interviewing and the additional information needed by the agencies, several independent variables were treated as univariate measures: attitude toward act, self-efficacy, moral norm, and intention. Exact question wording is listed in Table 1.

Both social norms and perceived behavioral control were measured with two questions. Social norms were operationalized both as a general question regarding land practices (“How my neighbors care for their property influences how I take care of mine”) and as a question specific to water resources (“People I know believe that good stewardship of water resources is very important”). Past research has noted that perceived behavioral control (PBC) can come from inner or personal constraints as well as external ones (Conner and Armitage 1998). In this study, one question asked the degree of perceived personal control over private land management (“I am able to obtain the knowledge and resources I need to care for my land”), and a second question tapped government involvement in private land management (“The government is making it easier for me to take care of the natural resources on my land”), a genuine concern in a state with more than 60 percent of the land owned by the state and federal governments. An additional question tapped self-efficacy: “How I treat my land doesn’t make much difference in the overall quality of the environment.”

Researchers who have studied environmental behavior have often included measures of environmental values in models of behavioral intention (Grob 1995; Trumbo and O’Keefe 2000). In addition, Beedell and Rehman (2000) found that British farmers with greater environmental awareness were more affected by conservation-related concerns and less by farm management concerns. Here, environmental values were measured with two frequently used questions drawn from previous survey instruments regarding the balance of nature and economic growth versus environmental quality (Dunlap and Van Liere 1978; Scott and Willits 1994) and with a third question that has been used for decades in the General Social Survey as a general indicator of environmental concern regarding the amount of money spent to protect the environment (Jones and Dunlap 1992). Table 1 provides wording for these three questions. Although there were significant correlations between these measures, scale reliability was insufficient to combine these three measures, so the three were entered separately into the model.<sup>1</sup>

**TABLE 1**  
**Operationalization of Variables for Theory of Planned Behavior**

<i>Variable</i>	<i>Survey Question</i>	<i>Mean</i>	<i>SD</i>
Intention	Thinking into the future, how likely is it that you might someday participate in a government-sponsored riparian improvement program?	2.5	1.2
Attitude toward act	I believe it is important to protect water resources.	3.5	.57
Social norm	How my neighbors care for their property influences how I take care of mine.	2.5	.79
Social norm—water	People I know believe that good stewardship of water resources is very important.	3.3	.53
Self-efficacy	How I treat my land doesn't make much difference in the overall quality of the environment. (scaling reversed)	2.8	.82
PBC: internal	I am able to obtain the knowledge and resources I need to care for my land.	3.2	.49
PBC: external	The government is making it easier for me to take care of the natural resources on my land.	2.1	.77
Environmental attitudes	The balance of nature is delicate.	3.1	.55
	Economic growth should be given priority, even if the environment suffers to some extent. (scaling reversed)	2.8	.74
	Would you say that the amount of money we spend as a nation to protect the environment is too much (1), too little (3), or about the right amount (2)?	2.0	.78
Moral responsibility	It is my moral responsibility to protect the resources on my land for future generations.	3.3	.58

NOTE: PBC = perceived behavioral control. The third environmental-attitudes question (amount of money spent on environment) was measured on a 3-point scale; all other questions were measured on 4-point scales. Responses to the question for intention used a scale of 1 (*very unlikely*) to 4 (*very likely*). Responses to all other questions used a scale of 1 (*strongly disagree*) to 4 (*strongly agree*).

Other researchers have argued for measures of knowledge concerning desired environmental behavior, reasoning that the more people know about their environment, the more appropriately they will behave (Grob 1995). We asked six questions to test knowledge of the value of riparian areas; these measures were combined into a single scale (alpha reliability coefficient = .79). These questions asked respondents how important they felt riparian areas were for things such as filtering water, keeping water temperatures cool, reducing floods and trapping sediments, and stabilizing streambanks.

Several studies employing the TPB have argued that current behavior is influenced by habit and repetition of past behaviors (Boldero 1995; Cheung, Chan, and Wong 1999; Eagly and Chaiken 1993). In the context of this study,

past actions taken to protect the riparian area on one's property could be strong indicators of future behavior. Meaningful past behavior could include past participation in a government-sponsored riparian program (of which there are several), as well as past actions taken independently to care for the riparian area, such as planting vegetation (not meant for livestock) and installing fencing. The question asked whether the landowner had in the past year planted vegetation (not meant for livestock), installed fencing between the property and the waterway, installed erosion control devices, and performed any other actions. Although some of these items were significantly correlated, scale reliability was insufficient to combine these measures of past action.<sup>2</sup>

Information exposure was measured by asking how much information about riparian areas the respondent had seen or heard lately from the media, friends and neighbors, and the government (1 = *absolutely none* to 5 = *a great deal*). Information seeking was measured by asking, "How much effort would you say you've made in the last 12 months to look for information on caring for the riparian land on your property?" (1 = *absolutely none* to 5 = *a great deal*). Scale reliability was insufficient to combine these measures.<sup>3</sup>

Finally, because background information provided by the agencies suggested possible barriers to participation in riparian programs, we designed questions to tap obstacles and motivations to participation. We asked an open-ended question regarding the biggest obstacle to participation and a Likert-type question regarding cost as a factor in land management decisions. We also included a series of four questions regarding the importance of several motivating factors for participation. These questions asked respondents to rate from 1 (*not very important*) to 5 (*very important*) how important rental payments, cost sharing, installation assistance, and supply of vegetation would be in their decision about whether to participate in a government-sponsored riparian program. These four financial motivational measures were combined into a single scale (alpha reliability coefficient = .68).

### *Data Collection*

A letter on university letterhead was sent to all individuals on the list ten days prior to telephone interviewing. The letter alerted the individual to the purpose of the study and to the upcoming phone call from a university student to conduct the survey. The letter also ensured voluntary participation, confidentiality, and anonymity of individual responses. Twelve returned letters with incorrect addresses were deleted from the sample, leaving a call list of 352.

Three entire class periods were devoted to student interviewer training (including interviewing strategies and protocol) and feedback from agency representatives. In addition, mock situations with types of callers (such as quiet, opinionated, and individualistic respondents) and complete one-on-one interviews (in student pairs) were conducted.

Actual interviewing took place during a ten-day period; four call attempts (at different times of the day to accommodate outdoor work schedules) were made before an individual was considered unreachable. The survey took an average of fifteen to twenty minutes to complete. The response rate was 59 percent (209 completed surveys, 44 refusals, and 99 unreachable).

## ***Results***

### *Descriptives*

The survey respondents were overwhelmingly male (88 percent), and like the farming and ranching profession nationwide, were older. The mean age was 57 and ranged from 26 to 99. Education varied widely; 41 percent received a high school diploma or less, while 26 percent finished college or a postgraduate degree. Thirty-two percent reported an income of less than \$30,000 a year, and about half earned between \$30,000 and \$60,000. The average number of acres owned was 293 and ranged from 1 to more than 10,000. Primary land use was agricultural; 94 percent were engaged in farming, agriculture, ranching, livestock, or combinations of them.

Most respondents (81 percent) believed that the best use for the riparian area on their property was its current use in agriculture, ranching, or farming. Respondents also believed the riparian area to be in good shape; 84 percent reported it in either excellent or good condition (which is a contrary assessment to that provided by the agencies).

### *Correlations*

Table 2 shows correlations between the variables tested as part of the TPB. There were very few significant correlations of intent with TPB variables; unrelated to intent were attitude toward the act (protecting water resources), internal and external PBC, moral norm, general social norm, and two measures of environmental values. Significant but small correlations were found between intent and the social norm regarding water (.16), self-efficacy (.16), information seeking (.19), and the environmental value regarding the balance of nature (.18).

TABLE 2  
Pearson Correlation Coefficients for Theory of Planned Behavior Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Intent	—	.06	.00	.16	.16	.01	.11	.18	.11	.04	.08	-.34	-.25	-.14	.19	.33	.41	.22
2. Attitude toward act		—	.23	.33	.08	.20	.03	.30	.15	.18	.39	-.01	-.06	.03	.13	.10	.06	.19
3. Social norm—general			—	.08	-.13	.05	.17	.03	.09	.10	.11	.04	-.11	.02	.13	.02	.01	.12
4. Social norm—water				—	.12	.20	.00	.35	.01	-.04	.34	-.03	.00	.01	.11	.10	.10	.12
5. Self-efficacy					—	.13	.00	.05	.07	.04	.02	-.06	-.06	-.11	.10	.09	-.02	-.04
6. PBC—internal						—	.15	.17	-.05	-.09	.17	.05	.00	-.04	.12	.04	.01	.06
7. PBC—external							—	.10	-.01	.11	.08	-.15	-.15	.02	.02	.10	.10	.14
8. Balance nature								—	.22	.08	.38	-.12	-.11	.01	.09	.17	.21	.25
9. Environment—economy									—	.26	.17	-.08	-.08	.02	.08	.04	.00	.18
10. Environmental spending										—	.14	-.10	-.06	-.07	.15	.03	.10	.22
11. Moral norm											—	-.06	-.14	-.04	.13	.17	.07	.32
12. Past participation												—	.27	.13	-.24	-.34	-.25	-.23
13. Past—fencing													—	.16	-.04	-.05	-.04	-.06
14. Past—vegetation														—	-.26	-.03	-.13	-.12
15. Info seeking															—	.32	.28	.16
16. Info—government																—	.32	.23
17. Motivations																	—	.36
18. Knowledge																		—

NOTE: PBC = perceived behavioral control. Correlations greater than .14 are significant at  $p < .05$ . Correlations greater than .20 are significant at  $p < .01$ .

All three measures of past behavior had significant negative correlations with intent, the strongest being with past participation ( $-.34$ ) and fencing ( $-.25$ ). Obviously, some respondents believed that if they had taken these actions in the past (whether individually or as part of a program), they were not inclined to participate in future riparian conservation programs. In addition, a large number had not participated in the past and did not intend to in the future.

The strongest positive correlations with intent were for financial motivations (.41), exposure to government information (.33), and knowledge of riparian values (.22).

Although the environmental values measures were not suitable for scaling, some of them were significantly, moderately correlated with each other. In addition, some environmental values were significantly correlated with other related measures, including attitude toward the act (protecting water resources), the moral responsibility of protecting resources for future generations, and social norms regarding water. Knowledge of riparian values was significantly correlated with most environmental values, as well as with motivations, information seeking, exposure to government information, attitude toward the act, and external PBC.

It is apparent from the correlations that some of the typical variables used in the TPB are either unrelated or only slightly related to behavioral intention.

### *Regressions*

As noted in the theoretical framework, we were most interested in maximizing predictive power (not establishing causal paths) in order for the clients to better target their information campaign. Therefore, variables were entered simultaneously in the regression with the "enter" method, allowing the Statistical Package for the Social Sciences (SPSS) program to determine the contribution (if any) of each independent variable in predicting the dependent variable.

In the first step of the analysis, a regression was run with the parsimonious variables of the earlier theory of reasoned action: attitude toward act, social norms, and intention. The results were not significant ( $R^2 = .03, p > .05$ ).

In the next step, all variables of the TPB were entered into a regression model. As shown in Table 3, 23 percent of the variance was explained. However, only four variables contributed significantly to the model: social norm—water, past fencing, past participation, and government information exposure. (Similar results were obtained, incidentally, when the regression was rerun with a stepwise procedure; all but these same four variables were excluded from the model and the  $R^2$  value decreased to 21 percent.)

**TABLE 3**  
**Regression Model of Theory of Planned Behavior**  
**Variables Predicting Behavioral Intention**

<i>Independent Variable</i>	$\beta$	<i>Partial Correlations</i>
Attitude toward act	-.024	-.02
Social norm—water	.146*	.15
Social norm—general	-.025	-.03
PBC—internal	-.028	-.03
PBC—external	.059	.06
Moral norm	-.038	-.04
Self-efficacy	.083	.09
Past behavior—vegetation	-.072	-.08
Past behavior—fencing	-.172*	-.18
Past behavior—participation	-.179*	-.18
Information—media	.008	.01
Information—neighbors	.033	.03
Information—government	.223**	.21
Information seeking	.013	.01

$R^2 = .23, p < .001$  (“enter” method, SPSS)

NOTE: PBC = perceived behavioral control; SPSS = Statistical Package for the Social Sciences).  
 \* $p < .05$ . \*\* $p < .01$ .

The regression model with the maximum predictive power is presented in Table 4. Twenty-nine percent of the variance in intent to participate is explained by financial motivations, past participation, past fencing, government information exposure, and self-efficacy.

The significant negative relationship between past participation and intended future behavior is contrary to previous research. As Table 5 indicates, of the 131 respondents who had not participated in the past, half are unlikely to participate in the future. In addition, one-third of those who did participate in the past do not intend to participate in the future. (It should be noted that past participation may have been in a different government program, not the current programs targeted by the agencies.) Landowners who participated in some kind of program may believe that additional participation is unnecessary and the riparian area needs no improvement. There may be a variety of reasons why respondents who have not participated in the past have little intention of doing so in the future; they may believe their riparian area to be in good condition, that obstacles to participation are too high, or that a government program is not a good solution.

**TABLE 4**  
**Maximum Predictive Stepwise Regression**  
**Model of Variables Predicting Behavioral Intention**

<i>Model and Variables</i>	<i>R<sup>2</sup></i>	<i>β</i>	<i>Partial Correlations</i>
1. Motivations	.16	.308**	.32
2. 1 + past participation	.22	-.150*	-.16
3. 2 + past behavior—fencing	.25	-.178**	-.20
4. 3 + information—government	.28	.165*	.18
5. 4 + self-efficacy	.29	.124*	.14

\* $p < .05$ . \*\* $p < .01$ .

**TABLE 5**  
**Intent to Participate and Past Participation**

	<i>Unlikely to Participate</i>	<i>Likely to Participate</i>	<i>Total</i>
Past participation—yes	24	52	76
Column %	21.8	53.6	36.7
Row %	31.6	68.4	100
Past participation—no	86	45	131
Column %	78.2	46.4	63.3
Row %	65.6	34.4	100
Total	110	97	207
Column %	100	100	100
Row %	53.2	46.8	100

NOTE:  $\chi = 22.4, p < .0001$ .

### ***Discussion***

The maximum predictive regression model paints a picture of a likely participant as a landowner who is highly interested in financial motivations (such as cost sharing), who has received government information lately about riparian areas (and perhaps has an existing relationship with government officials), and who believes that the way he treats his land makes a difference in environmental quality. In addition, if an individual has participated in any kind of government program or has undertaken fencing (possibly at his own initiative), he still may not intend to participate in the future, regardless of whether program outcomes would differ.

Although environmental values and knowledge of the value of riparian areas were excluded from this regression model, these measures were

nevertheless fairly important to this audience. Attitude toward the act of protecting water resources was high (3.5 of 5), as were knowledge of the value of riparian areas (3.8 of 5) and moral responsibility of protecting resources for the future (3.3 of 5). One contributing factor between the lack of relationship between environmental values and intent may be that respondents have a different evaluation of the current condition of their riparian area. Although the agencies report that a significant portion of riparian land in the state is degraded and in poor condition, the majority of respondents (84 percent) believe the riparian area on their land is in good or excellent condition.

There are several factors that may be involved in the lesser amount of variance explained by the TPB model than in the maximum predictive model. First, the target behavior is narrowly defined and, although voluntary, represents a monetary and more significant commitment. It was apparent that many of these landowners believe that they are already operating at the edge and would be highly motivated by costs and other assistance. In response to an open-ended question regarding the most important obstacle to upgrading the condition of their riparian area, 65 percent mentioned cost. Another 13 percent mentioned time or labor as the biggest obstacles. These landowners may not only disagree with land managers on what constitutes environmental damage but also may feel financially unable to correct it.

The significance of cost for this audience suggests that financial considerations may not be adequately measured with standard conceptualizations of PBC. The TPB may work well for relatively simple, noncostly behaviors under volitional control (such as recycling or water conservation) but may prove less accurate when monetary commitment increases. Lynne et al. (1995) concluded that the TPB pointed the way toward improving economic decision models, such as the Theory of Derived Demand. It may be that the inclusion of a financial variable in some models may strengthen the prediction of behaviors in which cost is a significant consideration.

A second factor that may have affected the TPB findings here is the demographics of the respondents, who were significantly older; ranged widely in education level; and were located in small, rural communities. Respondents reported that the traditional land use patterns of farming and ranching were considered the best use for their riparian areas, so therefore, they may see little reason to change current practices without significant incentive. As new generations take over farm and ranch operations, and as land is increasingly converted to nonfarm uses, attitudes toward riparian conservation may change. Among these respondents, there was a slight, significant, negative correlation ( $-0.17, p < .05$ ) between age and attitude toward the act of protecting water resources and a slight, significant positive relationship ( $0.14, p < .05$ ) between education and environmental values. This suggests that younger and

more educated landowners in charge of farms and ranches may possess different environmental sensibilities.

Finally, a third factor possibly affecting this outcome of the TPB involves the notion of "control." Fishbein (1993) noted that the theory of reasoned action might poorly predict behaviors requiring skills or resources outside an individual's control, hence the transformation into the TPB by incorporating the variable PBC. Operationalizations of PBC have included both perceptions of individual control stemming from internal or external sources and measures of self-efficacy capabilities. But are these any better measures of "control"? The TPB is still at the level of individual perception and intention and may never be able to fully account for the many behaviors that are not simple matters of individual control but are intricately bound with the constraints of the social system. Even with the theory itself, there are inherent tensions between what could be considered the personal (attitudes and beliefs) and the social (social norms and external control). Because of the involvement of factors beyond the level of the individual, it is perhaps no wonder that the TPB has had varying success in predicting individual behavior without full consideration of the social.

In this study, the individual or social tension is particularly obvious in several ways. Riparian areas lie at the interface of private land and public waterway and represent the essential tension of land management: private utilization of resources versus public stewardship of them. In a state with a significant amount of public land, government control (real or imagined) is a hot-button issue. On the matter of external PBC, less than one-third of respondents agreed that the government was making it easier for them to take care of resources on their land. In addition, in unsolicited comments, numerous respondents told interviewers about a poor past experience with a government agency or expressed confusion between agencies and their functions. Sentiment about government control may also be the reason for the large number of landowners who have not participated in past government-sponsored programs and have no intention of doing so in the future. For this population, it seems obvious that the respondents' perception of "control" over their behavior is a complex mixture of the individual-micro and the social-macro. It is then less surprising that financial motivations were linked to behavioral intention, with landowners highly interested in what a government program could give them.

There are several limitations to the present study. First, the results are clearly not generalizable to the general population because rural riparian landowners and participation in government programs represent a specific audience and a specific behavior. As noted, the TPB may be better suited to more general audiences and widely defined behaviors.

Second, because of the sentiments toward government noted above, the measure for “attitude toward the act” was phrased generally about protecting water resources but was not specific to protecting water resources through a government program. While the intention was not to “show our hand” early in the survey, in hindsight, the measure should have had a more direct link to the government program.

Third, questions on the survey instrument sometimes had different numbers of response categories, which was noted by Sutton (1998) as problematic. All Likert-type agree-disagree questions had five categories, but one series of questions had four choices (*strongly disagree*, *disagree*, *agree*, *strongly disagree*), a couple of questions (including one environmental measure taken from the General Social Survey) had only three, and measures of past behavior were yes-no responses.

Finally, this study did not follow up with a later measure of actual participation, primarily because current participation in the target program is so low. In addition, there is confusion and a lack of distinction regarding current government programs for riparian areas. For example, of the seventy-six individuals who said they had participated in some kind of government-sponsored program for riparian landowners, almost none could recall the specific program name.

An obvious suggestion for future research utilizing the TPB is for scholars to explore creative ways to more fully incorporate external constraints and social barriers into the model. At the least, these findings suggest that financial variables can be important moderators of perceived behavioral control when the behavior requires resources outside an individual’s control. The TPB holds even greater promise as a predictive model if it can more successfully negotiate the interface between individual attitude and volition and social constraints on them.

### *Notes*

1. Because these measures of environmental attitudes are well established in prior research, the lack of scale reliability here is puzzling. Perhaps the demographics of the respondents (rural farmers and ranchers) affected their responses. For example, this sample was older, predominantly male, and with a lower economic status than the general population, and two of the three questions concerned money and the environment.

2. One reason for the lack of scale reliability may be that these three measures of past action (past participation, fencing, and planting vegetation) represent different levels of commitment by the landowner and were interpreted differently.

3. This is not surprising. During the study period, riparian areas were not the focus of any information campaigns or newsworthy tie-ins (such as spring flooding, drought, or announce-

ments such as proposed listing of endangered riparian plants and animals) that would have made the topic "on the lips" of neighbors and mass media.

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