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# LANDOWNER MOTIVATIONS FOR CIVIC ENGAGEMENT IN WATER RESOURCE PROTECTION[1]

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ABSTRACT: Scholars and water resource professionals recognize citizens must get involved in water resource issues to protect water resources. Yet questions persist on how to motivate community members to get and stay civically involved in nonpoint source pollution issues, given that problems are often ill-defined. To be successful, interventions intended to engage individuals in collective action must be based on an understanding of the determinants of public-sphere behavior. The purpose of this study is to explore the psycho-social factors which influence landowner civic engagement in water resource protection. Data were collected using a self-administered mail survey of landowners in the Cannon River Watershed and analyzed using structural equation modeling. Study findings suggest landowners are more likely to be civically engaged in water resource issues if they feel a personal obligation to take civic action and perceive they have the ability to protect water resources. Landowners who believe water resource protection is a local responsibility, perceive important others expect them to protect water resources, and believe they have the ability to protect water resources are more likely to feel a sense of obligation to take civic action. A combination of strategies including civic engagement programs addressing barriers to landowner engagement will be most effective for promoting civic engagement in water resource protection.

(KEY TERMS: watershed management; public participation; water policy; water conservation.)

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## INTRODUCTION

Nonpoint source (NPS) pollution, the contamination of water resources from diffuse anthropogenic sources, originates in broad community or governance-level land use planning actions and policies (e.g., urban growth, agricultural land uses, storm water management infrastructure), as well as in individual-level land use decisions and practices (e.g., fertilizer use, riparian area alteration, salting icy sidewalks). NPS pollution has largely been defined as a technical problem requiring engineering solutions that target pollutant sources, fate and transport. In this article, we examine NPS pollution instead as a social dilemma of environmental decision making (Thøgersen, 1996; Nordlund and Garvill, 2003) requiring solutions that attend to individual moral choices and the collective and coordinated action of human communities. Social dilemmas are situations in which collective interests compete with self-interests. In a social dilemma, when individuals prioritize

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self-interests (i.e., behave rationally *vs*. morally), the interests of the collective (e.g., social group, organization, or society) suffer (Dawes, 1980; Dawes and Messick, 2000). Solving social dilemmas of environmental decision making such as NPS pollution requires civic engagement and collaboration in water resource discourse, deliberation, and decision making.

### *Collaborative Watershed Management and Civic Engagement*

Like many natural resource management regimes, the traditional decision-making structure in water governance has been agency dominated. A top-down approach has led to reductionism, addressing problems one at a time, stream segment by stream segment (Sabatier *et al.*, 2005b), rather than holistically. The approach has viewed water systems as separate from human systems and thus, dialogue and decision making have convened land use planners and water engineers but largely excluded landowners and resource users. Yet, the causes and consequences of NPS pollution are decidedly societal, requiring changes in the way humans individually and collectively view and interact with water and the natural environment. In contrast to the agency dominated approach, a collaborative watershed management approach examines all sources of and solutions to impairments within a hydrologically defined watershed (Sabatier *et al.*, 2005a; United States Environmental Protection Agency, 2008).

A second key tenet of collaborative watershed management is civic engagement, or community members connecting and working with others to define and solve local water resource problems (Morton and Brown, 2011). Community members are resource users and land managers who consume natural resources and make decisions with a direct impact on the environment. Community members should be considered principal stakeholders in watershed planning, because they are often primary plan implementers (Brooks *et al.*, 2006; Morton and Brown, 2011). Finally, community members offer important local knowledge about ecological, social, and economic conditions (Sabatier *et al.*, 2005a).

In collaborative watershed management, the challenge becomes engaging community members in *meaningful* civic engagement that will produce real water resource benefits (Wagenet and Pfeffer, 2007). Fagotto and Fung (2009) define civic engagement as "making public decisions and taking collective actions through processes that involve discussion, reasoning, and citizen participation *rather than* through the exercise of authority, expertise, status, political weight, or other such forms of power" (p. 1). While giving up authority or sole expert-status may be disconcerting to water resource managers, a growing body of research highlights the social, managerial, and ecological benefits of civic engagement in water resources. For example, water resource programs that involve community members in design and implementation have increased social capital (Prokopy and Floress, 2011), improved plan implementation (Lubell *et al.*, 2005; Sabatier *et al.*, 2005a), and built public support for funding and regulations (Larson and Lach, 2008). Civic engagement in water resource decision making also has increased trust and perceived legitimacy of planning processes (Trachtenberg and Focht, 2005). Though direct evidence of civic engagement resulting in water resource improvements is scant, a recent study linked collaborative watershed management to improved progress on total maximum daily load (TMDL) implementation in Ohio and West Virginia (Hoornbeek *et al.*, 2013).

Findings such as these are encouraging, yet questions persist on how to motivate community members to get and stay civically involved in NPS pollution issues, given that problems are often ill-defined. For instance, a landowner survey in an impaired watershed revealed that while respondents felt obligated to protect water on their own land, they felt significantly less obligated to talk to others about water resource problems or to work with other community members to protect water in the community (Davenport *et al.*, 2013). Studies also have shown that citizen-based watershed groups designed to promote civic engagement have had difficulty sustaining member involvement and interest (Koehler and Koontz, 2008; Floress *et al.*, 2009). To be effective in civic engagement, water resource managers need a better understanding of what drives and constrains civic engagement in environmental decision making.

### *Determinants of Civic Engagement*

An increasing body of literature has investigated the determinants of *private-sphere conservation action* of landowners and resource users (e.g., adoption of riparian buffers or conservation tillage). However, fewer studies have examined the determinants of *public-sphere conservation action* like civic engagement in water resource decision making. This research indicates that individuals with higher income and higher levels of formal education are more likely than their counterparts to be civically engaged in pro-environmental behavior (e.g., participation in environmental organizations) (Manzo and Weinstein, 1987; Smith, 1994; Larson and Lach, 2010). Other socio-demographic factors such as age, gender, homeownership, and length and location of

residence have also been associated with increased levels of civic engagement in environmental decision making (Manzo and Weinstein, 1987; Smith, 1994; Koehler and Koontz, 2008; Larson and Lach, 2010). Koehler and Koontz (2008) reported that males, those with environmentally related occupations and higher level of political activity were more likely than their counterparts to be active participants in collaborative watershed groups. Participation also varies geographically. Individuals from rural locations and those living closer to streams were more likely to be active participants than those from urban locations and living farther from streams (Koehler and Koontz, 2008; Larson and Lach, 2010). Socio-demographic characteristics such as age, income, and education provide important information about *who* commonly engages or does not engage in water resource decision making, but socio-demographics do not explain *what* motivates engagement. Studies of psycho-social determinants can guide program development and help managers remove barriers to participation.

Only a small subset of studies has investigated the *psycho-social* determinants of civic engagement in water resource management, though their contribution has been valuable. Increased civic engagement has been linked to stronger pro-ecological worldviews and support for water resource protection (Larson and Lach, 2010). Feelings of personal responsibility (Story and Forsyth, 2008) and higher levels of social capital and trust (Lubell, 2004; Larson and Lach, 2010) have led to higher engagement in water resource protection. Self-efficacy (Martinez and McMullin, 2004) and subjective norm or perceptions of social pressure to be civically engaged (Fielding *et al.*, 2008) have also emerged as strong predictors of civic engagement in environmental protection. This study builds on this body of research by exploring the psycho-social factors that influence landowner civic engagement in water resource protection in an impaired watershed. Given that conservation behavior is largely a moral decision (Thøgersen, 1996; Stern, 2000; Harland *et al.*, 2007), we apply the norm activation theory (NAT) (Schwartz, 1977) in our investigation of civic engagement in water resource decision making.

### *Applying Norm Activation Theory to Civic Engagement Behaviors*

Moral theories (e.g., NAT) suggest that public-sphere conservation action (e.g., participating in conservation programs, supporting environmental laws) is influenced by feelings of moral obligation, or personal norms (Stern, 2000). Pro-environmental behaviors are situations of moral choice when an individual's actions have consequences for the welfare of others (e.g., Nordlund and Garvill, 2003; Harland *et al.*, 2007). According to the NAT, the intensity of personal obligation an individual feels to take action influences behavior (Schwartz, 1977). Similarly, personal norm is a central driver of pro-environmental behavior in the value belief norm (VBN) theory (Stern, 2000). For example, Stern *et al.* (1999) reported a statistically significant influence of personal norms to act on environmental citizenship (e.g., signing petitions in support of environmental laws). Similarly, Gärling *et al.* (2003) found that personal norm to protect the environment was a significant predictor of pro-environmental behavioral intention (e.g., donating money to an environmental organization). In a survey of Dutch university students, individuals who felt a personal obligation to volunteer were more likely to volunteer for an environmental organization (Harland *et al.*, 2007). In another application of VBN, Johansson *et al.* (2013) found that landowners who had participated in conservation programs felt a greater sense of personal obligation to participate in biodiversity conservation programs than landowners who had not participated.

**Activators of Personal Norm.** Personal norms are activated by beliefs about the consequences of an environmental condition, a sense of personal responsibility for those consequences (Schwartz, 1977), the perceived ability to take action (Schwartz, 1977; Stern, 2000) and the perceived expectations of important others (Bamberg and Möser, 2007). NAT and VBN postulate that personal norms are activated when an individual is aware of the adverse consequences of an environmental condition (i.e., awareness of consequences) and ascribes responsibility to relevant actors or to self to reduce the threat of those adverse consequences (i.e., ascription of responsibility) (Stern, 2000). In various studies, Stern and colleagues (Stern and Dietz, 1994; Stern *et al.*, 1999; Stern, 2000) have demonstrated the predictive ability of awareness of consequences and ascription of responsibility. In a direct application of Schwartz's NAT, Gärling *et al.* (2003) demonstrated the influence of awareness of consequences and ascription of responsibility on personal norms to protect the environment, which in turn predicted pro-environmental behavioral intention (e.g., contributing money to an environmental organization).

Other norm activators have received increasing attention. Perceived ability and social norms, along with ascription of responsibility, have been established as more proximal determinants of personal norms than awareness of consequences (Steg *et al.*, 2005; Bamberg and Möser, 2007; Harland *et al.*, 2007). According to NAT, individuals feel a stronger

sense of personal obligation when they believe that they have the ability to take action (Schwartz, 1977), or the perception of the availability of resources or capabilities required to perform a behavior (Harland *et al.*, 2007). This construct is similar to the perceived behavioral control (PBC) construct in the theory of planned behavior (TPB). PBC refers to an individual's perception about the ease or difficulty of performing a behavior. According to TPB, the greater the perceived control one has over a behavior, the more likely a person is to perform that behavior (Ajzen, 1991). Although ability has typically been omitted from most NAT studies of environmental behavior (e.g., Steg and De Groot, 2010), perception of one's control over and ability to take action have been reported as significant predictors of pro-environmental behaviors such as recycling (Cheung *et al.*, 1999), environmental activism (Fielding *et al.*, 2008), green hotel choice (Han *et al.*, 2010), and choice of reforestation method (Karppinen, 2005). Further, Harland *et al.* (2007) reported that ability to act significantly influenced behavioral intentions to use modes of transportation other than car and to conserve water. The authors also determined that the relationship between ability and behavioral intentions was mediated by personal norm, suggesting that ability not only influences behavior but also personal norms.

Subjective norm is the "perceived social pressure to perform or not perform a behavior" (Ajzen, 1991, p. 188) and has been shown to influence behavioral intentions and more recently, to be an activator of personal norms. According to TPB, individuals are more likely to engage in a behavior if they perceive that significant others approve of that behavior. For example, social norms around water stewardship influenced landowners' participation in riparian improvement programs (Corbett, 2002). However, other studies have found weak relationships between subjective norm and behavioral intention (Armitage and Conner, 2001), suggesting that additional sources of norms may influence the behavior (Cialdini *et al.*, 1990, 1991). In a meta-analysis of the determinants of pro-environmental behavior, Bamberg and Möser (2007) demonstrated the influence of subjective norm on personal norm, indicating that social factors play an important role in the activation of personal norms. More recent work, including the development of the comprehensive action determination model (Klöckner and Blöbaum, 2010; Klöckner, 2013) supports the notion that subjective norms activate personal norms.

### *Study Conceptual Model*

This study's conceptual model (Figure 1) draws on NAT and TPB to examine the proximal determinants of civic engagement behavior that are prone to change (i.e., likely to be influenced by interventions): beliefs about responsibility to protect water, perceived ability to protect water resources, social expectations of important others, and feelings of personal obligation to be civically engaged. We have omitted more distal and stable (i.e., unlikely to be influenced by interventions) variables such as values and awareness of consequences (Stern and Dietz, 1994). We hypothesize that landowners are more likely to be civically engaged if they feel a personal obligation to be civically engaged in water resource issues and if they feel that they have the ability to protect water resources. Further, we hypothesize that landowners generate feelings of personal obligation when they ascribe responsibility for water resource protection to local actors (e.g., landowners), are influenced by expectations of important others regarding conservation behavior, and perceive that they have the ability to protect water resources.

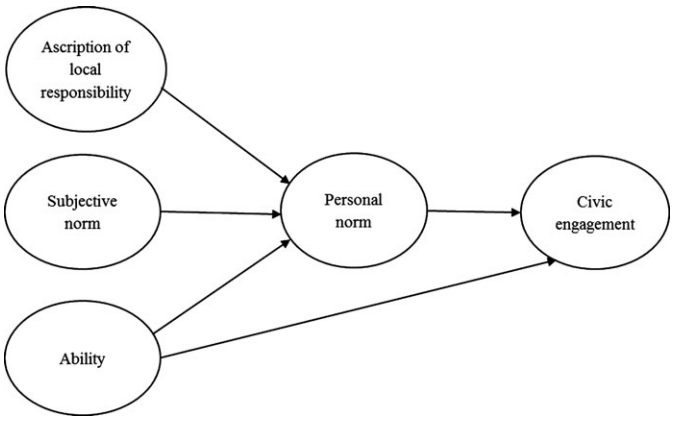


FIGURE 1. Study Conceptual Model.

## METHODS

### *Study Site*

The study was conducted in the Cannon River Watershed. The two major rivers in the Cannon River Watershed, Cannon and Straight Rivers, drain into the Mississippi River. The Cannon River Watershed stretches across 10 counties, with Rice, Steele and Goodhue counties covering almost three quarters (73%) of the total area in the watershed (National Resources Conservation Service, n.d.). The major land use in the watershed is agricultural, with approximately 70% of the land used for agricultural production. The major pollutants of concern in the watershed are sediment, phosphorus, *Escherichia*

*coli*, and pesticides (Cannon River Watershed Partnership, 2011).

The existing management structure in the watershed includes multiple government entities at the state and local levels. While local counties, soil and water conservation districts and cities have water management plans, Minnesota Board of Soil and Water Resources is responsible for ensuring that local plans are coordinated with state water protection efforts. Cannon River Watershed Partnership (CRWP), a citizen-initiated nonprofit group, in partnership with Minnesota Pollution Control Agency (MPCA) and other local partners developed a watershed-wide management strategy. Their management strategy emphasizes the need for landowners' civic engagement in watershed protection (Cannon River Watershed Partnership, 2011). In the Cannon River Watershed, the current management approach, with its focus on the TMDL process, has not provided the means for people to be engaged in watershed protection. Water resource professionals in the area have identified the need to develop effective intervention strategies to engage people "who live, work and recreate in the watershed" (Cannon River Watershed Partnership, 2011, p. 54). Further, the CRWP has identified citizen-based watershed groups as another approach to increase civic engagement in water resource protection. The findings from this study will help watershed professionals in the Cannon River Watershed address future civic engagement needs outlined in their watershed management plan.

### *Procedures and Sample*

Data were collected using a self-administered mail survey of stratified random sample of 1,082 landowners from five subwatersheds within the Cannon River Watershed (approximately 200 landowners from each subwatershed). The sampling frame was generated from county tax records. An adapted version of Dillman *et al.*'s (2009) tailored design method was employed and included three mailing waves, each with a cover letter and a survey questionnaire. The surveys were administered from October through December 2013. The survey instrument was designed based on literature review and feedback from pre-tests of the questionnaire. The primary survey objectives (Davenport *et al.*, 2014) were to assess (1) landowner values and beliefs about water resource protection, (2) landowners' current and future conservation behaviors, and (3) the social influences on landowner conservation behavior. In the first page of the questionnaire, conservation practices were defined as "any effort or practice that prevents and/or minimizes degradation of water resources." The questionnaire included six sections. The first section explored landowner perspectives on their community. The second section asked questions about landowners' environmental values. In the third section, respondents were asked about their perspectives on water resource problems, their ability to take action, and who they think should be responsible for protecting water quality. The fourth section included questions about their current conservation and civic actions, their future conservation actions, subjective and personal norm of conservation behavior and individuals and groups that influence their conservation behavior. The fifth section explored their perspectives on water resource management actions in Minnesota. The final section included property characteristic and sociodemographic questions.

### *Measures*

**Ascription of Local Responsibility.** Ascription of local responsibility was measured using two items adapted from previous research (e.g., Steg *et al.*, 2005; De Groot and Steg, 2009): "Landowners/property owners in my community should be responsible for protecting water quality" and "Local government should be responsible for protecting water quality." The items were modified to measure *local* responsibility rather than *personal* responsibility. Respondents rated each item on a 5-point Likert scale from *strongly disagree* to *strongly agree*.

**Subjective Norm.** Items used to measure subjective norm are consistent with recommendations by Ajzen (1991). Two items adapted from previous research (e.g., Karppinen, 2005; Bernath and Roschewitz, 2008) measured subjective norm to protect water resources in the study: "People who are important to me expect me to use conservation practices on my land/property" and "People who are important to me expect me to do whatever I can to prevent water pollution." Respondents were asked to rate each item on a 5-point Likert scale from *strongly disagree* to *strongly agree*.

**Ability.** Ability was formulated similar to PBC in the TPB (Ajzen, 1991; Corbett, 2002; Willcox *et al.*, 2012). Landowners' perceived ability to protect water resources (e.g., by using conservation practices) was assessed using two items: "I have the knowledge and skills I need to use conservation practices on my land/property" and "I have the time to use conservation practices on my land/property." Respondents were asked to rate each item on a 5-point Likert scale from *strongly disagree* to *strongly agree*.

**Personal Norm.** Personal norm to protect water resources was measured using three items adapted from Harland *et al.* (2007). An example item is "I feel a personal obligation to work with other community members to protect water quality." Respondents were asked to rate each item on a 5-point Likert scale from *strongly disagree* to *strongly agree*.

**Civic Engagement.** Civic engagement was measured using three items. Respondents were asked to report the number of times they have engaged in the three civic engagement behaviors in the past 12 months. Behaviors included "participated in a CRWP initiative" and "worked with community members to protect water resources." Responses were coded on a 5-point scale as 0 times (1), 1 time (2), 2-4 times (3), 5-10 times (4), and more than 10 times (5).

### *Analysis*

Cronbach's alpha was used to assess internal consistency of each latent variable measured with more than two items, while Pearson correlation was used for latent variables measured with two items. Cronbach's alpha assesses the extent to which responses to survey items correlate with each other. Pearson correlation provides information about the strength and direction of relationship between two measures (Vaske, 2008). Validity (convergent and discriminant) of the model constructs was evaluated based on factor loadings of each item on their latent constructs and an assessment of average variance explained (AVE). AVE was calculated manually in Microsoft Excel 2010 using the formula provided by Fornell and Larcker (1981). Two criteria have to be met for discriminant validity of latent constructs, (1) correlations between pairs of latent constructs should be less than 0.85 (Kenny, 2012; http://davidakenny.net/cm/mfactor.htm), and (2) AVE square root scores should be larger than factor correlation values (Fornell and Larcker, 1981).

The hypothesized relationships were analyzed using structural equation modeling (SEM). SEM allows the use of multiple measures to construct latent variables. Further, the ability of SEM to allow assessment of relationships among a chain of latent variables in a single model (Maruyama, 1998) was important to this study, as we wanted to understand the influence of a set of beliefs on personal norm, and the influence of personal norm on civic engagement using an integrated theoretical framework.

The latent variables (i.e., ascription of local responsibility, subjective norm, etc.) were constructed and tested using confirmatory factor analysis simultaneously with the SEM analysis of the structural model. The analysis of the conceptual model is confirmatory in nature, without any model modifications, to avoid the issue of capitalization on chance findings (MacCallum *et al.*, 1992). The correlation matrix of the observed variables was used as the input matrix. The analysis was conducted using the maximum likelihood method in LISREL 8.80 (Scientific Software International, Inc., Skokie, Illinois).

We assessed model fit using maximum likelihood $\chi^2$, relative $\chi^2$ ($\chi^2$/df), root mean-square error of approximation (RMSEA), comparative fit index (CFI), incremental fit index (IFI), non-normed fit index (NNFI), and standardized root mean square residual (SRMR). Nonsignificant $\chi^2$ value indicates that the model is consistent with the data. Larger and significant values of $\chi^2$ indicate poorer model fit. However, maximum likelihood $\chi^2$ is directly related to sample size. Therefore, additional fit indexes are needed to assess model fit. A relative $\chi^2$ of five or less indicates an acceptable model fit (Schumacker and Lomax, 2004). RMSEA values below 0.10 are acceptable. RMSEA is also an appropriate index to compare fit of nested models. Values of CFI and IFI above 0.95 are recommended as a cutoff value. A threshold of SRMR $\leq$0.08 is recommended for a model with acceptable fit (Hu and Bentler, 1999).

## RESULTS

### *Respondents*

Of the 1,082 surveys mailed, 246 were returned undeliverable and 290 completed surveys were received, resulting in a final response rate of 35%. Most of the respondents were male (79%), not of Hispanic or Latino origin (99%) and white (97%). Between 95% (Rice County) to 99% (Goodhue County) of homeowners in the watershed are not of Hispanic or Latino origin (Table 1) and over 92% of all homeowners in the watershed are white. Respondents' median age (60) is also comparable to the age of homeowners in the watershed (Table 1). A majority of respondents (68%) own five or fewer acres. Almost one-third of respondents (29%) reported using their land for agricultural production. However, almost three-quarters of respondents (71%) do not depend on their land for income. A majority of respondents own and manage their own land (86%) and also make their own decisions about how to manage their land (86%).

A majority of respondents somewhat to strongly agreed with items such as "Landowners/property owners in my community should be responsible for protecting water quality" (96%) and "People who are important to me expect me to do whatever I can to prevent water pollution" (69%). About half of the

TABLE 1. Study Area Resident Demographic Characteristics (5 major counties of 10 represented in the watershed).

| County | Rice (%) | Steele (%) | Goodhue (%) | Dakota (%) | Le Sueur (%) |
|---|---|---|---|---|---|
| Percent area in watershed[1] | 28.6 | 24.6 | 20.2 | 10.1 | 9.9 |
| Homeowner origin[2] | | | | | |
| Hispanic or Latino | 4.8 | 2.4 | 1.0 | 2.5 | 1.5 |
| Not Hispanic or Latino | 95.2 | 97.6 | 99.0 | 97.5 | 98.5 |
| Homeowner race[2] | | | | | |
| White | 96.5 | 98.0 | 97.8 | 93.1 | 98.5 |
| Others | 3.5 | 2.0 | 2.2 | 6.9 | 1.5 |
| Age of homeowner[2] | | | | | |
| 15-24 | 1.5 | 1.6 | 1.6 | 1.0 | 1.4 |
| 25-34 | 12.1 | 12.9 | 11.1 | 13.3 | 12.4 |
| 35-44 | 18.4 | 18.2 | 15.4 | 20.6 | 17.8 |
| 45-54 | 24.6 | 23.3 | 24.6 | 27.5 | 23.3 |
| 55-64 | 20.1 | 19.6 | 21.3 | 20.3 | 20.4 |
| 65 and over | 23.3 | 24.4 | 26.0 | 17.2 | 24.7 |

[1]Data from United States Department of Agriculture, Natural Resource Conservation Service.
[2]Data from 2010 Census Statistics (US Census Bureau).

respondents somewhat to strongly agreed with items measuring personal norm such as "I feel a personal obligation to work with other community members to protect water quality" (51%). However, levels of civic engagement in water resource protection were low. Over three-quarters of respondents had not engaged in activities such as participating in a CRWP initiative (78%) and working with community members to protect water quality (79%) in the last 12 months (Table 2).

### *Reliability and Validity Analysis*

List wise deletion of model variables yielded an effective sample size of 274. Structural equation modeling (SEM) requires a minimum sample size of 200 or 5-20 times the number of parameters to be estimated (Lei and Wu, 2007; Kline, 2011). The ratio of sample size to the number of parameters to be estimated in this analysis (32) is 8.6, which is within the recommended guideline. This reduced dataset was used for all statistical analyses including reliability analysis and SEM.

Personal norm ($\alpha = 0.85$) and civic engagement ($\alpha = 0.79$) exhibited acceptable internal consistency. Bivariate correlations of items measuring ascription of local responsibility ($r = 0.50$), subjective norm ($r = 0.69$) and ability ($r = 0.52$), demonstrate moderate to strong correlations. Factor loadings of each item on their respective latent constructs ranged from 0.60 to 0.85 (Table 3). Nine of the twelve indicators have factor loadings of over 0.70 as recommended by Kline (2011). All of the indicators meet acceptable factor loading thresholds of ≥0.50 (Fornell and Larcker, 1981).

TABLE 2. Descriptive Statistics and Frequency of Responses to Items Measuring Constructs in the Structural Model.

| Survey item[1] | Mean* | SD | Disagree (%) | Neither Agree nor Disagree (%) | Agree (%) |
|---|---|---|---|---|---|
| Landowners/property owners in my community should be responsible for protecting water quality | 1.57 | 0.64 | 0.7 | 3.6 | 95.6 |
| Lakeshore and streamside landowners should be responsible for protecting water quality | 1.64 | 0.60 | 0.7 | 3.6 | 95.6 |
| People who are important to me expect me to use conservation practices on my land/property | 0.73 | 0.90 | 6.2 | 34.7 | 59.1 |
| People who are important to me expect me to do whatever I can to prevent water pollution | 0.85 | 0.83 | 4.4 | 26.3 | 69.3 |
| I have the knowledge and skills I need to use conservation practices on my land/property | 0.42 | 1.07 | 20.1 | 25.5 | 54.4 |
| I have the time to use conservation practices on my land/property | 0.55 | 0.98 | 15.3 | 25.2 | 59.5 |
| I feel a personal obligation to learn more about water resource issues in my watershed | 0.69 | 0.79 | 4.4 | 32.8 | 62.8 |
| I feel a personal obligation to talk to others about conservation practices | 0.48 | 0.83 | 9.5 | 41.2 | 49.3 |
| I feel a personal obligation to work with other community members to protect water quality | 0.53 | 0.85 | 8.0 | 41.2 | 50.8 |
| **Civic engagement[2]** | | | **0** | **1-10** | **>10** |
| Heard about a CRWP initiative | 2.30 | 1.16 | 36.8 | 61.0 | 2.2 |
| Participated in a CRWP initiative | 1.35 | 0.73 | 78.0 | 21.6 | 0.4 |
| Worked with community members to protect water quality | 1.34 | 0.74 | 79.2 | 20.4 | 0.4 |

Notes: SD, standard deviation; CRWP, Cannon River Watershed Partnership.
*$n = 274$.
[1]Items measured on a 5-point scale from strongly disagree (−2) to strongly agree (+2).
[2]Response coded as the number of times respondents have engaged in these activities in the past 12 months.

TABLE 3. Reliability Analysis and Factor Loadings of Items Measuring Constructs in the Structural Model.

| Latent Variable | Survey Item | Standardized Factor Loadings ($\lambda$) | Coefficient Alpha ($\alpha$) |
|---|---|---|---|
| Ascription of local responsibility[1] | Landowners/property owners in my community should be responsible for protecting water quality | 0.78 | 0.50[3] |
| | Lakeshore and streamside landowners should be responsible for protecting water quality | 0.64 | |
| Subjective norm[1] | People who are important to me expect me to use conservation practices on my land/property | 0.86 | 0.69[3] |
| | People who are important to me expect me to do whatever I can to prevent water pollution | 0.80 | |
| Ability[1] | I have the knowledge and skills I need to use conservation practices on my land/property | 0.79 | 0.51[3] |
| | I have the time to use conservation practices on my land/property | 0.65 | |
| Personal norm[1] | I feel a personal obligation to learn more about water resource issues in my watershed | 0.85 | 0.85 |
| | I feel a personal obligation to talk to others about conservation practices | 0.80 | |
| | I feel a personal obligation to work with other community members to protect water quality | 0.78 | |
| Civic engagement[2] | Heard about a CRWP initiative | 0.60 | 0.79 |
| | Participated in a CRWP initiative | 0.82 | |
| | Worked with community members to protect water quality | 0.84 | |

[1]Variables measured on a 5-point scale from *strongly disagree* (−2) to *strongly agree* (2).
[2]Response coded as 0 (1), 1 (2), 2-4 times (3), 5-10 times (4), and more than 10 times (5).
[3]Bivariate correlations for constructs measured with two items.

TABLE 4. Discriminant Validity Matrix.

| Constructs | AR | SN | AB | PN | CE |
|---|---|---|---|---|---|
| AR | **0.71** | | | | |
| SN | 0.41 | **0.83** | | | |
| AB | 0.14 | 0.27 | **0.72** | | |
| PN | 0.44 | 0.45 | 0.33 | **0.81** | |
| CE | 0.21 | 0.24 | 0.34 | 0.49 | **0.76** |

Notes: AR, ascription of local responsibility; SN, subjective norm; AB, ability; PN, personal norm; CE, civic engagement.
Off-diagonal elements are correlations between constructs. Diagonal elements (bold) are the square root of average variance extracted (AVE) between the constructs and their indicators. To meet the criteria for correlation, off-diagonal elements should be less than 0.85 and AVE square root scores should be larger than correlations in the same row and column.

The factor correlations between each pair of the latent constructs ranged from 0.14 to 0.49 (Table 3), below the suggested value of 0.85 for discriminant validity of these constructs (http://davidakenny.net/cm/mfactor.htm). Further, AVE square root scores of all latent constructs were larger than factor correlation scores (Table 4). These results support acceptable discriminant validity and show that the latent constructs included in the model are distinct psychological constructs.

### *Structural Model*

The structural model consisting of *ascription of local responsibility, subjective norm*, and *ability* as exogenous variables and *personal norm* and *civic engagement* as endogenous variables exhibited an acceptable model fit (Figure 2). The relative chi-square of the model was less than 5 ($\chi^2$/df = 1.57). CFI, IFI, and NNFI were also over the cutoff value of 0.95. RMSEA of the model was within the acceptable limit of 0.10 (RMSEA = 0.046). SRMR was below the threshold of 0.08 (SRMR = 0.045). The model explains 15% of the variance in civic engagement and 33% of the variance in personal norm.

Consistent with the predictions of this study, all of the proposed paths in the model were statistically significant ($\alpha \leq 0.05$). *Ascription of local responsibility* was the strongest predictor of *personal norm* ($\beta = 0.30$). *Subjective norm* ($\beta = 0.27$) and *ability* ($\beta = 0.22$) were also statistically significant positive predictors of *personal norm*. This finding supports the hypothesis that landowners generate feelings of personal obligation when they ascribe responsibility for water resource protection to local actors (e.g., landowners), are influenced by expectations of important others regarding conservation behavior, and perceive that they have the ability to protect water resources. The paths from *personal norm* ($\beta = 0.42$) and ability ($\beta = 0.19$) to *civic engagement* were also statistically significant (Figure 2). This supports the hypothesis that landowners who feel a personal obligation to be civically engaged are more likely to be civically engaged in water resource protection. Further, landowners who believe that they have the ability to protect water resources are also more likely to be civically engaged in water resource protection. Thus, perceived ability to protect water resources influences civic engagement directly, but

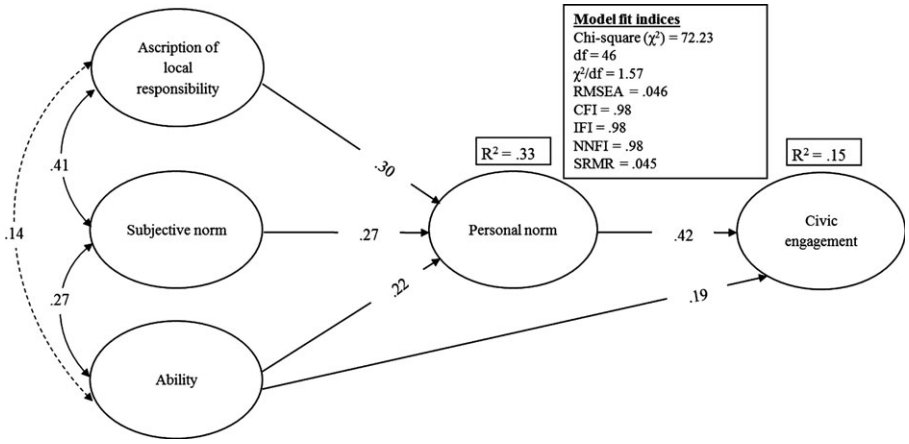


FIGURE 2. Standardized Solution for Final Structural Model of Beliefs, Personal Norm and Civic Engagement in Water Resource Protection. Note: RMSEA, root mean square error of approximation; CFI, comparative fit index; IFI, incremental fit index. ⟶Significant ($p \leq 0.05$), - -▸Nonsignificant ($p \geq 0.05$).

also indirectly through its influence on personal norm.

Overall, the results support the prediction that personal norm of civic engagement and perceived ability to protect water resources will influence landowner civic engagement in water resource protection, and that personal norm of civic engagement is influenced by beliefs about local responsibility for water resource protection, expectations of important others (i.e., subjective norm) and perceived ability to protect water resources.

## DISCUSSION

### *Theoretical Contributions*

Study findings support a moral basis for civic engagement in water resource protection. The study identifies three constructs: ascription of local responsibility, subjective norm, and ability, as proximal activators of personal norms, of civic engagement. Study findings illuminate the relationships between landowner beliefs, norms and civic engagement in water resource protection. Study findings offer strong support for a moral approach to understanding and influencing pro-environmental behavior. Further, this study sheds new light on the internalization of perceived social expectations as a personal norm of civic engagement.

**Landowner Civic Engagement in Water Resource Protection Is Driven by Personal Norms and Perceptions of the Ability to Protect Water Resources.** Consistent with previous applications of NAT and VBN (e.g., Stern *et al.*, 1999; Harland *et al.*, 2007), feelings of personal obligation to engage were significant predictors of civic engagement in water resource protection. While previous studies have demonstrated that personal norms influence private-sphere conservation behaviors such as water conservation (Harland *et al.*, 2007) and willingness to reduce car use (Nordlund and Garvill, 2003), this study reveals that personal norms also drive public-sphere water resource protection. Landowners who feel morally compelled to be civically engaged are more likely to take civic actions such as talking to their neighbors about water resource problems or joining a watershed group. Study results also demonstrate that perceived ability has a significant and direct influence on civic engagement. Thus, even in situations when personal norms to protect water resources are activated, real or perceived lack of resources such as time and skills may constrain landowners' civic engagement in water resource protection.

**Personal Norms of Civic Engagement in Water Resource Protection Are Activated by Beliefs About Local Responsibility, Perceived Social Expectations, and Perceived Ability to Protect Water.** Study findings support the norm activation process outlined in NAT. Data analysis indicates that landowners are more likely to feel a personal obligation to act, if they believe that water resource protection is a local responsibility, perceive that important others expect them to protect water resources, and perceive that they have the ability to protect water resources. Findings also support previous observations that subjective norms influence behavior through personal norms (Bamberg and Möser, 2007; Klöckner, 2013) or an internalization

process. Subjective norms may serve as a basis for self-evaluation, thus activating personal norms. Expectations of important others are fundamental considerations for activating self-expectations. These findings indicate that when making decisions about whether or not to engage civically in water resource protection, landowners consider what important others expect of them.

### *Future Research*

The integrated model examined in this study explained 15% of the variance in civic engagement and 33% of the variance in personal norm. Future research should expand on the relationships between beliefs, norms, and civic engagement by examining other factors such as landowners' social identification (Terry and Hogg, 1996; White *et al.*, 2009) with their community and their self-identity (Stryker and Burke, 2000) as water resource stewards. The influence of descriptive norms or the behavior of others (Cialdini *et al.*, 1991) on personal norm and civic engagement also needs further investigation.

A general caveat in the interpretation of these study findings is that although SEM allows for the analysis of hypothesized relationships between theoretical constructs, causality cannot be established due to the correlational nature of this study. A methodological limitation of this study is that the three exogenous latent variables (i.e., ascription of local responsibility, subjective norm, and ability) were measured with only two items. Typically, three or more measures of latent constructs are recommended in structural equation modeling (Kline, 2011). Scales consisting of more measures will also allow for better estimates of internal consistency of the theoretical construct (Vaske, 2008). However, two measures still allow us to disentangle different sources of variance in latent variable SEM (Maruyama, 1998; Kline, 2011). Past research on pro-environmental behavior have reported reliable model estimates using two item constructs in latent variable SEM (Kaiser *et al.*, 2005). Future studies should develop scales of latent variables that consist of three or more items with acceptable score reliability. Although the sample size in this study was adequate for SEM analyses, the low survey response rate resulted in a selective sample. These methodological factors potentially limit the generalizability of study findings and could have led to the low proportion of explained variance in civic engagement.

Despite these limitations, this article shows that landowners' civic engagement in water resource protection is driven by personal norms and perceived ability to take action. These findings have multiple practical implications for water resource managers trying to engage community members in water resource protection.

### *Implications for Collaborative Watershed Management*

Landowner civic engagement in decision making can help build social capital (Prokopy and Floress, 2011), establish trust and legitimacy of the decision-making process (Trachtenberg and Focht, 2005), and lead to more effective implementation of water resource protection efforts (Sabatier *et al.*, 2005a). Study findings suggest some strategies to better engage landowners and resource users in collaborative watershed management processes in the study watershed and beyond. We found that landowners are motivated by their personal norms and constrained by their ability (i.e., knowledge, skills, and time) to engage in water resource protection. A combination of civic engagement strategies that appeal to landowner norms and beliefs, and address barriers to behavior change are needed.

**Civic Engagement Intervention Strategies.** Establishing water resource protection as the social norm in a community increases the likelihood that landowners will internalize these norms and take civic action. These findings are consistent with community-based social marketing strategies (McKenzie-Mohr, 2000; Kennedy, 2010). For example, water resource managers would publicize "success stories" of water resource protection to establish conservation as a social expectation and norm of behavior rather than focusing primarily on communicating water resource problems.

Studies on interventions aimed at energy conservation have shown that information about "what others are doing" influences residential energy use (Schultz, 1999; Schultz *et al.*, 2007). Similarly, benchmarking or providing farmers with feedback about their behavior leads to normative pressure to keep up with others and encourages them to share information and learn from each other (Sutherland and Peel, 2011; de Snoo *et al.*, 2013). Events to show appreciation for landowner involvement in conservation initiatives may provide normative feedback (Schultz, 1999) and can be an effective way to promote landowner engagement.

Commitments, or pledges to change behavior have been successfully applied as an intervention strategy in energy conservation (Abrahamse *et al.*, 2005), composting and encouraging water efficiency (McKenzie-Mohr, 2000). In a study of farmer conservation behavior, commitment along with tailored informa-

tion resulted in an increase in the time farmers spent on conservation (e.g., reduced use of pesticides) (Lokhorst *et al.*, 2010). Further, research suggests that individuals who agree to a small initial request are more likely to engage in substantial activities in the future (McKenzie-Mohr, 2000). In the Cannon River Watershed, conservation initiatives should ask landowners to make small commitments to talk to others about conservation practices. The process of staged building of commitment (Kennedy, 2010) can lead to landowner participation in more substantial CRWP initiatives.

However, these strategies may not be successful until barriers to behavior change are addressed. Resource professionals long have known that perceived ability (e.g., resources, knowledge, and skills) affects adoption of best management practices (i.e., private-sphere behaviors) among landowners and resource users. This study indicates that the same is true for civic engagement behaviors such as conservation citizenship and advocacy. Those who have the knowledge, skill, and time to use conservation practices on their own properties are more likely to work with other community members in water resource protection and participate in conservation initiatives. Thus, clearly opportunities exist to further develop existing conservation champions' (i.e., practice adopters) skills in communication, leadership, and community organizing. This finding also points to the ongoing need to address barriers and constraints to perceived ability and provides support for communication and outreach programs that enhance knowledge and skills around conservation practices.

CRWP has identified citizen-based watershed groups as another approach to increase civic engagement in water resource protection. How can CRWP best cultivate interest in and support for this program? Study findings suggest that civic leaders are more likely to have social referent groups that put pressure on them to use conservation practices. Further descriptive analysis of the study data revealed that respondents who perceived the greatest social pressure to act were most commonly influenced by family members, neighbors, environmental advocacy organizations, soil and water conservation districts (SWCD), CRWP, university researchers, local extension agents, local cooperatives, and agronomists in their conservation decisions. In other words, there are a variety of social groups and organizations who have influence on conservation decision making and ultimately, civic action. These groups should be brought to the table as advisors to civic engagement efforts and other initiatives aimed at promoting conservation as a social norm and civic responsibility.

## CONCLUSION

Study findings show that when landowners perceive social dilemmas such as water resource protection as a moral choice, they are more likely to be civically engaged. As Schwartz (1977) suggests, this study reveals that personal norms are influenced by the cognitive structure of beliefs including perceived local responsibility for water resource protection, subjective norms of conservation action and the ability to protect water resources on one's own property. Importantly, the study establishes subjective norms as a useful addition to moral approach theoretical models such as NAT and VBN. The expectation of important others has a significant influence on landowners' civic engagement in water resource protection.

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