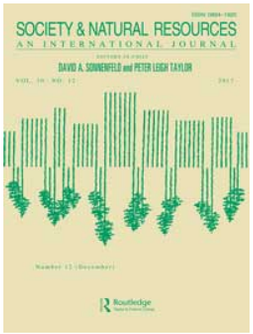

Routledge
Taylor & Francis Group

Society & Natural Resources
An International Journal

ISSN: 0894-1920 (Print) 1521-0723 (Online) Journal homepage: http://www.tandfonline.com/loi/usnr20

The Influence of Place on the Willingness to Pay for Ecosystem Services

Max Nielsen-Pincus, Patricia Sussman, Drew E. Bennett, Hannah Gosnell & Robert Parker

To cite this article: Max Nielsen-Pincus, Patricia Sussman, Drew E. Bennett, Hannah Gosnell & Robert Parker (2017) The Influence of Place on the Willingness to Pay for Ecosystem Services, Society & Natural Resources, 30:12, 1423-1441, DOI: 10.1080/08941920.2017.1347976

To link to this article: https://doi.org/10.1080/08941920.2017.1347976

SOCIETY & NATURAL RESOURCES
2017, VOL. 30, NO. 12, 1423–1441
https://doi.org/10.1080/08941920.2017.1347976

Routledge
Taylor & Francis Group

The Influence of Place on the Willingness to Pay for Ecosystem Services

Max Nielsen-Pincus[a], Patricia Sussman[b], Drew E. Bennett[c], Hannah Gosnell[d], and Robert Parker[e]

[a]Department of Environmental Science and Management, Portland State University, Portland, OR, USA; [b]Environmental Incentives, LLC, South Lake Tahoe, CA, USA; [c]Department of Fish, Wildlife, and Conservation Biology, Colorado State University, Fort Collins, CO, USA; [d]Geography Program, College of Earth, Ocean, and Atmospheric Sciences, Oregon State University, Corvallis, OR, USA; [e]Community Planning Workshop, Department of Planning, Public Policy, and Management, University of Oregon, Eugene, OR, USA

ABSTRACT

Sense of place, including an individual's attitudes toward specific geographic settings, is generally predicted to influence willingness to engage in place-protective behaviors. Relatively little research, however, has empirically examined the influence of people's attitudes toward a place on their willingness to pay for environmental protection. Using the example of a payment for ecosystem services (PES) initiative in the McKenzie River watershed, Oregon, USA, we found that place attitudes were a significant predictor of respondents' willingness to pay for a program designed to benefit drinking water quality. These results suggest that connecting conservation actions to landscapes that are meaningful to people may increase their financial support for PES and other conservation programs. While program managers have little or no influence over stakeholders' political ideology, gender, or income, managers may be able to influence prospective PES buyers' awareness and attitudes through targeted communications, thereby potentially increasing support for place-based conservation efforts.

ARTICLE HISTORY
Received 8 August 2016
Accepted 17 April 2017

KEYWORDS
Conservation finance; contingent valuation; incentives; payments for ecosystem services; place attitudes; political ideology; sense of place; watershed services; WTP

Introduction

Payments for ecosystem services (PES) are a rapidly growing mechanism for incentivizing environmental management that is increasingly being promoted by governments and non-governmental organizations (Engel, Pagiola, and Wunder 2008; Tallis et al. 2008). Generally, PES can be defined as "the transfer of resources between social actors [aimed at creating] incentives to align individual and/or collective land use decisions with social interest[s] in the management of natural resources" (Muradian et al. 2010:1205). PES institutions can be developed around specific ecosystem services (e.g., drinking water quality in a specific watershed) or around the more general environmental outcomes from conservation (e.g., biodiversity). PES initiatives, however, have been critiqued as commodity fetishism (Kosoy and Corbera 2010) suggesting that development of a land

CONTACT Max Nielsen-Pincus maxnp@pdx.edu Department of Environmental Science and Management, Portland State University, PO Box 751, Portland, OR 97207, USA.

Supplemental data for this article can be accessed on the publisher's website at https://doi.org/10.1080/08941920.2017.1347976.

ethic should be based on moral, rather than financial, responsibility for stewardship. Another critique suggests that PES reifies techno-scientific ecological modernization solutions to problems that need deeper introspection (Ernston and Sörlin 2013), such that PES programs reinforce existing social and cultural inequities, and that existing laws and regulations require more stewardship from landowners than ascribed by PES. A counter argument suggests that water utility customers are beneficiaries of important services that are provided by their source watersheds and, as consumers, have an ethical responsibility to contribute to stewardship of those services (Groenfeldt and Schmidt 2013). In spite of these debates, environmental managers work in a dynamic and complex environment that requires pragmatic solutions, of which PES is one.

The outcome of a PES institution is an economic transaction between willing buyers and sellers (Wunder 2005) such as a city resident and a watershed landowner. Although many analyses focus on how much ecosystem service buyers are willing to pay (WTP) in a PES transaction, an equally important question asks what influences ecosystem service buyers' WTP and whether managers have any control over the factors that influence WTP. Understanding consumer WTP is important since stated preferences can help managers identify acceptable prices for non-market environmental services. Although much research has examined the influence of demographics, ideology, and resource use on WTP (Carson et al. 2001), relatively little research has examined the influence of attitudes about place on an individual's WTP (e.g., Lurie et al. 2013; Morrison and Dowell 2015). Some authors have inferred a sense of place effect on WTP from measures of distance between a respondents home and a place of concern (Pate and Loomis 1997) or from one's movement outside of their home (Zia et al. 2014). As a component of one's sense of place (Tuan 1975), place attitudes can represent intertwined emotional, belief, and behavioral dimensions of a person's relationship with a place (Jorgensen and Stedman 2006). Place attitudes also represent a source of potential interest for environmental managers due to the relatively malleable nature of attitudes (Eagly and Chaiken 1998). This paper aims to contribute to our understanding of how connections between people and place manifest in intended economic behavior by specifically testing the relationship between place attitudes and WTP in a case study of a local water-related PES program. We begin with an overview of the state of knowledge about water-related PES before addressing past research on what influences WTP for environmental goods and services and the role of place in influencing WTP.

Payments for Watershed Services

One trend in the development of PES is the growing focus on watershed services such as natural filtration of drinking water resulting from a healthy functioning watershed (Martin-Ortega, Ojea, and Roux 2013). PES initiatives targeting the protection of drinking water supplies typically seek to engage water consumers, such as utility customers, as buyers and landholders, on or adjacent to streams and rivers, as sellers of watershed services (Kosoy et al. 2007; Bennett et al. 2014) to reduce pollutant loading in drinking water sources or reduce risks of disturbances like wildfire.

Watershed services have been historically undervalued by virtue of many watersheds' treatment as a commons or a public good (Postel and Thompson Jr 2005). To overcome this tragedy of the commons "payment for watershed services" (PWS) institutions may

be designed to incentivize collective behavior that coordinates the actions of public and private actors in a watershed to benefit watershed health (Muradian et al. 2010; Vatn 2010). For example, Grolleau and McCann (2012) highlight PWS programs in New York City and Munich, Germany, where nearby source watersheds provide drinking water for over 10 million people between the two cities. In response to declining water quality, both cities partnered with source watershed landowners to develop programs to support and pay for changes in land use, the development of innovative agricultural and forestry practices, and other initiatives designed to improve water quality. These and other PWS programs are often founded on the notion that the clean drinking water provided by healthy watersheds has a value that can be supported by the market or public policy. The place-based nature of PWS initiatives differentiates them from global PES initiatives, such as carbon markets and biodiversity conservation programs (Kinzig et al. 2011) by making them more susceptible to the place attitudes than global PES initiatives. We assert that the value proposition overarching the ecosystem services provided by healthy functioning watersheds can be broadened by considering the emotional, cognitive, and behavioral bonds people often have with their watersheds in addition to the value of clean water.

Programs like the examples provided by New York City and Munich are becoming more common globally. Bennett, Carroll, and Hamilton (2013) identified 205 active PWS programs in 29 countries around the world, twice as many as just three years earlier (Stanton et al. 2010), many of which target the protection of drinking water supplies (Goldman-Benner et al. 2012). In an analysis of PWS programs in Latin America, Africa, and Asia, Brouwer, Tesfaye, and Pauw (2011) found 33 programs in which the protection of drinking water was a primary objective. Bennett et al. (2014) found a similar number in the USA, identifying 23 PWS programs targeting the protection of drinking water supplies.

Although the implementation of PWS efforts vary, most provide economic incentives to influence land management practices that maintain or enhance water quality through the protection or restoration of riparian buffers, restrictions on the development of ecologically important property, or the implementation of best management practices (BMPs). These actions are intended to benefit downstream water users, such as drinking water providers and their customers, who play the role of "service buyers" by providing incentive funding for upstream landowners (Martin-Ortega, Ojea, and Roux 2013). Drinking water source protection programs financed by water providers, however, are unlikely to flourish unless their customers are WTP for these efforts through some type of PWS initiative.

Influences on Willingness to Pay for Ecosystem Services

Most research exploring WTP for non-market environmental goods utilizes contingent valuation (CV) surveys or choice experiments (CE). A CV survey provides a basic description of a proposed PES initiative and asks individuals how much they would be WTP for the preservation or restoration of non-market environmental goods and services (Carson 2011). CE, in contrast, typically elicits tradeoffs implicit in people's choices among a variety of PES program attributes including price. Empirical findings from both CV and CE studies generally support the notion that individuals with greater incomes and who directly use the resource in question are WTP more than those with lesser incomes or less frequent use (Flores and Carson 1997).

Political affiliation has also been associated with WTP in recent years, although the association may depend upon the means by which environmental goods and services are provided (Dupont and Bateman 2012). In the United States, political ideology consistently has been a significant predictor of environmental concern since the 1970s (Dunlap 1975; Jones and Dunlap 1992; Dupont and Bateman 2012). The partisan divide over US environmental attitudes generally leans toward "politically liberal" support for environmental programs, while "politically conservative" ideology tends to view environmental policy as an unnecessary constraint on individual freedom and market function. In non-US contexts, American liberal and conservative ideologies may be recognized as left-wing and right-wing political alliances elsewhere (Dupont and Bateman 2012). Researchers have extended this political predisposition to WTP for environmental protection (Neumayer 2004; Bateman and Dupont 2010). As such, policy makers and resource managers might expect that American "politically conservative" ideology may hinder support and funding for successful PWS programs.

Other research has examined the influence of age and attitudes about the likely success or appropriateness of specific environmental protection mechanisms on WTP. Age typically has a negative relationship with WTP (Carson, Flores, and Meade 2001), while attitudes about specific environmental protection mechanisms can vary in their influences on WTP depending on the mechanism (Dupont and Bateman 2012). The role of place in PWS initiatives is less well tested despite the place-specific nature of watershed services. For this reason, we next define place attitudes and explore how they may influence WTP for watershed services.

Place Attitudes

Attitude theory (Eagly and Chaiken 1998) has been used to explore the strength of the connections between person and place (Jorgensen and Stedman 2001; Nielsen-Pincus et al. 2010). Attitude theory posits that specific attitudes influence an individuals' intention to engage in specific behaviors, and further that intentions are a necessary ingredient for planned behavior (Ajzen 1991). In this paper, we adopt an attitude framework and measure place attitudes rather than the specific meanings that underpin one's sense of place for particular locations or landscapes.

Attitudes about a place can manifest as emotional bonds (Altman and Low 1992), beliefs about oneself (Proshansky, Fabian, and Kaminoff 1983), or preferences for locations that facilitate some objective (e.g., hiking, or spending time with family; Williams and Vaske 2003). These manifestations represent the overlapping constructs of place attachment, identity, and dependence, respectively (Jorgensen and Stedman 2006), and despite different approaches to their conceptual organization and structure (e.g., Williams and Vaske 2003; Kyle, Graefe, and Manning 2005), we find the attitude theory approach sufficient to represent positive and negative evaluations of place.

Place attitudes are often correlated with human behavior or behavioral intentions (Vaske and Kobrin 2001; Stedman 2002). For instance, in Australia, Tucker et al. (2006) found that individuals who were more likely to undertake river protective behaviors had strong place attitudes within the domains of place attachment, identity, and dependence. Similarly, place attachment was positively correlated with residents' acceptance of a tidal energy convertor in two villages in Northern Ireland (Devine-Wright 2011), and linked

to proenvironment behavioral intentions of national park visitors in Canada (Halpenny 2010). Place attitudes have also been examined in the context of public goods and ecosystem services. Hailu, Boxall, and McFarlane (2005) found that stronger place identity increased recreational demand for camping in Alberta, Canada. However, relatively little research has used place attitudes as a predictor of WTP for environmental goods and services. In one example, however, Larson et al. (2012) showed that place attachment was the strongest predictor of support for visitor fees at state parks in Georgia.

Although proximity to place has commonly been used as a proxy for a psychological connection to specific places (Brown, Reed, and Harris 2002; Pocewicz and Nielsen-Pincus 2013), the explicit link between economic theory and the psychology of place is less common. We hypothesize that stronger place attitudes, specifically those linked to place-based PWS initiatives, will lead to greater WTP for the protection of a place and the goods and services it provides. This hypothesis is particularly relevant to environmental managers who typically can't influence stakeholder ideology (or other demographics factors), but may be able to craft messages or develop programs that establish and enhance people's connections with specific places. To test our hypothesis, we use the example of a developing PWS program in the McKenzie River watershed, Oregon, USA.

Methods

Study Area and Context

The McKenzie River watershed (~350,000 ha) is the sole source of drinking water for the city of Eugene, Oregon. The McKenzie River flows west from Oregon's Cascade Mountains approximately 90 km to the floor of the Willamette Valley (Figure 1). Although the upper reaches of the watershed are designated as wilderness and nearly two-thirds of the watershed is managed by the United States Forest Service, the lower reaches are dominated by private forestland, agricultural, and residential uses. The McKenzie River watershed provides many recreational opportunities, spectacular scenery, and easy access making the watershed an important source of amenities for many Eugene residents.

The Eugene water and electric board (EWEB) is a publicly-owned utility that supplies drinking water from the McKenzie River to more than 55,000 residential connections (EWEB 2011). Water quality monitoring conducted by EWEB in the 2000s showed a gradual increase in several pollutants believed to be caused by increasing residential development, poorly sited septic systems, pesticide and herbicide application, and the loss of the natural filtration services provided by riparian and floodplain vegetation along the McKenzie River and its tributaries (EWEB 2011). In response, EWEB and county officials proposed stricter land use regulations to protect riparian forests. Residents of the watershed vigorously opposed the proposal as a perceived violation of their property rights, and successfully blocked its adoption (Cooper 2010). Many landowners in the McKenzie River watershed expressed publically the concern that a regulatory approach would treat riparian and floodplain landowners as bad actors. A regulatory approach, they argued, would label property owners as individuals that society needed to be protected from rather than as potential partners whose capacity for stewardship could contribute to public welfare. As an alternative, EWEB and watershed stakeholders began developing a PWS initiative, called the voluntary incentives program (VIP), to incentivize and reward watershed residents to

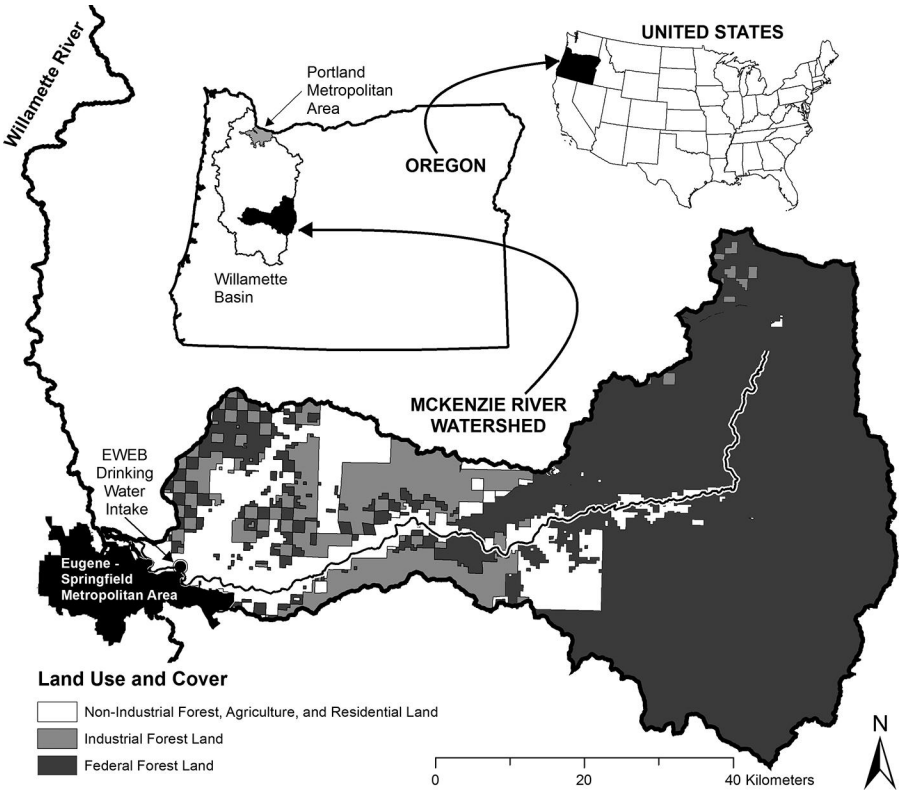

Figure 1. The McKenzie River watershed in Oregon's Willamette basin.

protect remaining high quality riparian areas and restore other, more degraded areas (Lurie et al. 2013).

Sampling and Data Collection

We identified a random sample of 980 EWEB residential drinking water customers. Residential drinking water customers were located by census tract;[1] in an effort to mitigate for anticipated survey response bias lower income census tracks were slightly oversampled and higher income census tracts were slightly undersampled (i.e., we expected greater response rates from higher income areas).

The survey was conducted between March and May of 2012 using a four contact Dillman (2000) method that used a mixed mode mail and web approach. The questionnaire consisted of 31 questions, about half of which were multi-item questions with Likert-type responses. Questions were focused on the McKenzie River watershed respective to the respondents' (1) willingness to pay for a VIP-like program, (2) awareness of their source of drinking water, (3) place attitudes, (4) use of the watershed, and (5) respondent demographics, including income, political ideology, gender, age, and education. WTP was measured using a contingent valuation approach (see Supplemental materials, Figure S1) rather than a choice experiment because urban water ratepayers may be relatively unfamiliar with rural conservation program attributes making the cognitive process of evaluating

different choice sets relatively difficult. Some limitations of CV were addressed by clearly describing the PES initiative and payment means, and by asking respondents to report how certain they were about their WTP at several different payment levels (Champ et al. 1997; Shaikh, Sun, and Cornelius van Kooten 2007). To encourage participation, EWEB offered a $10 bill credit to all individuals who completed the survey on their next utility bill.

Data and Measures

WTP for the VIP program was measured in the questionnaire using a multiple bounded discrete choice format question (Welsh and Poe 1998) that asked each respondent to rate the level of certainty with which they would be WTP at each of the following levels, $0.50, $1.00, $3.00, $5.00, or $10.00, for a water quality improvement program in the McKenzie River watershed through an additional fee on their monthly water bill. Monthly payment levels were selected based on input from EWEB program managers. Respondent certainty for each payment level was assessed by asking respondents to select from a 5-point response scale including *Definitely Yes, Probably Yes, Unsure, Probably No*, and *Definitely No*. We recoded the response data into two measures based on respondent certainty (Champ et al. 1997). The first measure was recoded to indicate bid levels where a *Definitely Yes* response was recorded; the second measure was recoded to indicate bid levels where a *Probably* or *Definitely Yes* response was recorded.

Respondent awareness of their drinking water source was measured by the first item on the questionnaire, which asked, prior to receiving the questionnaire, whether the respondent knew that the McKenzie River was their source of drinking water. Responses were coded as yes (1) and no (0).

Place attitudes were determined through a nine-item question measuring place attachment, place identity and place dependence in association with the McKenzie River watershed (Table 1). The nine-item scale has been used in various studies that have found it provides good construct validity for measuring the overlapping domains of place attitudes (Jorgensen and Stedman 2001; Nielsen-Pincus et al. 2010). Respondents rated each item on a 5-point Likert-type scale ranging from strongly agree (2) to strongly disagree (−2), with a midpoint labeled neither agree nor disagree. An exploratory factor analysis using a maximum likelihood extraction revealed one common factor with an eigenvalue greater than one. We created an overall place attitude score for each respondent by summing the responses to each of the nine items, which resulted in a score ranging from −18 to 18 (Chronbach's alpha = 0.89).

Use of the watershed was determined by asking respondents how often they visited the McKenzie River watershed for various purposes. Fifteen categories of activities were provided including hiking, camping, swimming, hunting, scenic drives, and working among others. Respondents chose the frequency with which they engaged in each activity in the watershed according to six options ranging from weekly to never. Responses were converted to an interval scale for each activity, approximating the number of times respondents visited the watershed annually (e.g., weekly = 52; monthly = 12; etc.). We summed the values for each of the 15 activities to create a frequency of use score, and accounted for the skewed distribution using the natural logarithm of the score in regression modeling—relatively few users were intense users while most users frequent the watershed only occasionally.[2]

Table 1. Place attitude items and exploratory factor analysis loadings.

Items[b]	% Agree	Factor loadings[c]
Place attachment		
It is my favorite place to be	33	0.78
I feel happiest when I am there	39	0.72
I really miss it when I am away for too long	25	0.71
Place identity		
It reflects the type of person I am	41	0.74
I feel I can really be myself when I'm there	48	0.67
I don't really identify with the McKenzie river watershed[a]	52	0.63
Place dependence		
It is the best place for me to do the outdoor things I enjoy	72	0.48
As far as I am concerned there are better places to be[a]	37	0.69
I would enjoy the activities I undertake there just as well in another place[a]	74	0.47

[a]Responses were measured on a 5-point Likert-type response scale ranging from strongly disagree (−2) to strongly agree (2), with the mid-point (0) labeled neither agree nor disagree. Negatively worded items were reverse coded for analysis.
[b]Place attitude items were measured in response to the question, "How much do you agree or disagree with the following statement about the importance of the McKenzie River Watershed to you personally". Chronbach's alpha for all nine items was 0.89, exhibiting high internal validity.
[c]Factor loadings were derived from an exploratory factor analysis using a maximum likelihood factor model. Prior communality estimates were derived from the squared multiple correlation (SMC) between each variable and all other variables. Only factors with eigenvalues greater than 1 were extracted. A varimax rotation was specified, but because only one factor was extracted, no rotation was performed. The eigenvalue of the first factor extracted was 7.82 and final communality estimates ranged from 0.22 to 0.61.

Income was measured by asking respondents to select one of five categories that best described their household income in 2011 before taxes. Response categories ranged from less than $25,000 to $100,000 or more in $25,000 bins. For regression modeling we used the log value of the midpoint of each bin with a pareto-tail adjustment to correct for extreme values in the unbounded highest bin (Miller 1966).

Political ideology was determined by asking respondents to rate their American political tendencies along a 5-point Likert-type scale ranging from very conservative (2) to very liberal (−2), with a mid-point labeled neither conservative nor liberal.

Finally, we collected other demographic variables including age (based on the year the respondent was born), gender (female = 0), and education (ranging from less than a high school diploma (0) to completion of a graduate or professional degree (5)). Response mode was also recorded as mail (0) or internet (1).

Data Analysis

To test our hypothesis we developed two regression models. Each model used a panel data arrangement where the dependent variable (y) was a binary response measuring willingness to pay (1 or 0) repeated for each bid amount. One model was created for the *Definitely Yes* response and one model was created for the *Probably Yes* response. Both models included all variables described above as covariates. We specified a probit function for the cumulative distribution function using the bid plus covariates, respectively, as predictors of WTP:

$$F(X;\ \beta) = \Phi(\alpha + x\beta) \tag{1}$$

In the model Φ is the cumulative normal distribution function with a mean of zero and a standard deviation of one, α is the estimated constant, and the term $x\beta$ is a vector of independent variables and estimated slope coefficients for the bid level and covariates. Although Greene (2012) suggests there is little theoretical basis to selecting the probit

versus other functional forms (e.g., logit) for discrete choice modeling, we selected the probit model because of the more conservative estimates of the probability of WTP at the tails of the distribution. Mean WTP values were estimated as $(-(\alpha + \sum \bar{x}\beta)/\beta_{\mathrm{WTP}})$, where $\sum \bar{x}\beta$ is the sum of the products of the mean value for each covariate and its slope coefficient, and β_{WTP} is the slope coefficient for the bid amount. We assessed for potential multicollinearity among the covariates by examining variance inflation factors (VIF) and the correlation matrix of all covariates. Variance inflation factors were all below 2.0, and 94% of correlations were below 0.30.

All analyses were performed in SAS 9.2 (SAS Institute, Cary, NC, USA), and no bias in missing data was detected.

Results

Response Summary

We received 421 responses for a 43.0% response rate. Fifteen respondents answered a minimal amount of the questionnaire and were dropped from the analysis, for a final sample size of 406 EWEB residential water customers. Respondent characteristics are reported in Table 2.

Respondents averaged 54 years of age at the time of the survey. Men comprised 54% of respondents. Over half of respondents (54%) reported having a college degree. Household income was the least reported respondent characteristic (n = 352), and the pareto-tail adjustment estimated the top unbounded income bin at $184,754. A plurality of respondents reported a liberal political tendency (48%), and the vast majority (91%) reported using the McKenzie River watershed for some purpose at least once a year. Use was skewed toward less intense use, with 50% of respondents using the watershed less than monthly. Respondents scored between −15 and 18 on the place attitude scale and averaged 2.36, indicating slightly positive attitudes. Positive place attitudes were recorded for the majority of respondents (57%), while negative place scores were recorded for over a quarter of respondents (28%); the remainder recorded scores at the midpoint (zero) on our scale. Over a quarter of respondents (26%) did not report being aware that the McKenzie River was their source of drinking water, and nearly half (42%) responded to the survey using the electronic web-based version of the questionnaire.

A primary area of potential bias in the survey response was educational attainment, with a majority of respondents reporting a bachelor's degree or higher (54%; 30% reported a graduate or professional degree). According to the (United States Census Bureau [USCB] 2012), less than 35% of Eugene residents have attained a bachelor's degree or higher. Only about 10% of respondents reported a high school diploma or less as their highest educational attainment compared to over 25% of Eugene residents (USCB 2012). Differences from census demographics are likely related to differences between the population of residents of Eugene and EWEB water utility customers; compared to the general population of Eugene, EWEB ratepayers are less likely to be younger or students, and more likely to be homeowners (Community Planning Workshop [CPW] 2013).

A majority of respondents (54%) reported that they were definitely WTP at least $0.50 per month on their water bill to support a watershed protection program (Table 3). Less than half of respondents (45%) indicated that they were not WTP a minimum of $0.50

Table 2. Eugene water and electric board ratepayer respondent characteristics summarized by category for all characteristics except age.

Respondent characteristics	
Age mean and range (n = 368)	54 years (20–93)
Gender (n = 378)	
Men	54%
Women	46%
Educational attainment (n = 381)	
<HS	<1%
HS diploma	10%
Associate's degree	28%
Some college	8%
College degree	24%
Graduate or professional degree	30%
Household income (n = 352)	
<$25,000	19%
$25,000–$49,999	26%
$50,000–$74,999	23%
$75,000–$99,999	13%
>$100,000	19%
Political ideology (n = 378)	
Very conservative	9%
Moderately conservative	19%
Neither conservative nor liberal	24%
Moderately liberal	31%
Very liberal	17%
Frequency of use of the McKenzie River watershed (n = 406)	
>Weekly	14%
<once per week, but more than monthly	36%
<monthly, but more than every 3 months	32%
<quarterly, but at least annually	9%
Never or <annually	9%
Total place attitude scores (n = 376)	
Negative place attitudes	57%
Neutral place attitudes	15%
Positive place attitudes	28%
Aware that McKenzie River is drinking water source (n = 383)	
Yes	74%
No	26%
Response mode (n = 406)	
Mail	58%
Internet	42%

on their monthly water bill. Although the majority of respondents were WTP $0.50 per month, only 41% were WTP $1.00 per month and the proportion of respondents WTP declined at larger bid amounts. The probability that respondents were probably WTP was generally greater than the probability respondents were definitely WTP at each bid

Table 3. Willingness to pay a monthly water utility fee to support a watershed protection program by definitely vs probably response and survey mode.

	Frequency (%)					
	Definitely WTP			Probably WTP		
Bid amount	Internet	Mail	Total	Internet	Mail	Total
$0.50	105 (61%)	115 (49%)	220 (54%)	143 (84%)	172 (73%)	315 (78%)
$1.00	77 (45%)	90 (38%)	167 (41%)	128 (75%)	149 (63%)	277 (68%)
$3.00	30 (18%)	40 (17%)	70 (17%)	85 (50%)	95 (40%)	180 (44%)
$5.00	19 (11%)	16 (7%)	35 (9%)	53 (31%)	62 (26%)	115 (28%)
$10.00	4 (2%)	6 (3%)	10 (2%)	34 (20%)	34 (14%)	68 (17%)
Total responses	171	235	406	171	235	406

level. For example, only 17% of respondents indicated they would definitely be WTP more than $3.00 per month, while 44% were probably WTP more than $3.00 per month.

Influence of Bid Levels on Willingness to Pay

Regression models examined how likely respondents were to be WTP for a water quality protection program for the McKenzie River watershed on their monthly water bill at different bid levels controlling for other factors (Table 4). The estimated slope coefficients for the bid amounts (β_{WTP}) for both the definitely and probably WTP models were significant ($\alpha < 0.001$). The definitely WTP model has a steeper slope with respect to the effect of the bid amount relative to the probably WTP model (Figure 2a). The probability of a respondent definitely being WTP the stated bid amount drops sharply from the initial bid level ($0.50) to nearly zero as the bid levels exceeded $5.00 per month. In contrast, the amount that respondents were probably WTP was consistently higher and less steep than the amount respondents were definitely WTP. The estimated probit distributions predict about a 60% chance that respondents would be either definitely or probably WTP $1 extra on their monthly water bill. However, as the bid amount increases the models show there remains a 60% chance that ratepayers will report being probably WTP $5.00 extra per month on their water bill, but less than a 10% chance that respondents would report being definitely WTP that amount.

Mean willingness to pay was $1.60 per month for the definitely WTP model, and $5.76 per month for the probably WTP model. The nearly fourfold increase in mean WTP in the

Table 4. Probit regression results and average marginal effects (AME) of willingness to pay on monthly water bills for a water quality protection program in the McKenzie River watershed.

	Definitely WTP amount		Probably WTP amount		
	Coefficient	AME	Coefficient	AME	Variable means[b]
Intercept	−0.267 (0.188)		0.177 (0.023)		
Bid amount	−0.401*** (0.008)	−7.39%	−0.304*** (0.007)	−8.62%	$1.12 dWTP $3.02 pWTP
Place attitudes	0.030*** (0.003)	11.18%	0.017*** (0.003)	4.83%	2.36
Aware of source (Yes = 1)	0.079* (0.035)	3.11%	0.090* (0.042)	2.57%	74.4%
Use (ln days/year)	0.022** (0.007)	0.25%	0.014 (0.008)	0.12%	2.05
Survey Mode (Internet = 1)	0.148*** (0.030)	5.77%	−0.013 (0.036)	−0.36%	42.1%
Income (ln $/year)	0.052** (0.019)	4.94%	0.084*** (0.023)	7.14%	10.86
Political ideology[a]	−0.217*** (0.013)	−8.37%	−0.143*** (0.016)	−4.12%	−0.28
Gender (Men = 1)	−0.035 (0.029)	−1.37%	0.218*** (0.036)	6.19%	54.5%
Age (years)	−0.005*** (0.001)	−2.01%	0.001 (0.001)	0.23%	54.3
Education	0.104*** (0.012)	4.07%	0.099*** (0.014)	2.98%	3.35
Mean WTP	$1.60		$5.76		
N	317		317		
Nagelkerke R^2	0.58		0.45		

[a]Conservative was coded positive.

[b]dWTP = definitely WTP; pWTP = probably WTP; income and user frequency were entered into the model as a logged values (mean income was equal to $52,307 and mean user frequency was 7.76 days per year); gender, awareness, and mode were entered as dummy variables; and education, political ideology, and place attitudes were entered into the model as scales.

*$p < 0.10$, **$p < 0.01$, ***$p < 0.001$.

Note: Regression coefficients are unstandardized and standard errors are in parentheses. AMEs were calculated by estimating the marginal effects at different response anchors for each variable while holding all other variables at their means. AME was calculated in $1.00 increments for bid amount; by income bin midpoints for respondent income; at each anchor point for place attitudes, political ideology, and education; in 10-year increments for age; in weekly increments (pre-logged) for use. AME for gender, awareness, and survey mode was calculated as the difference between women and men, aware and not aware, and internet and mail, respectively.

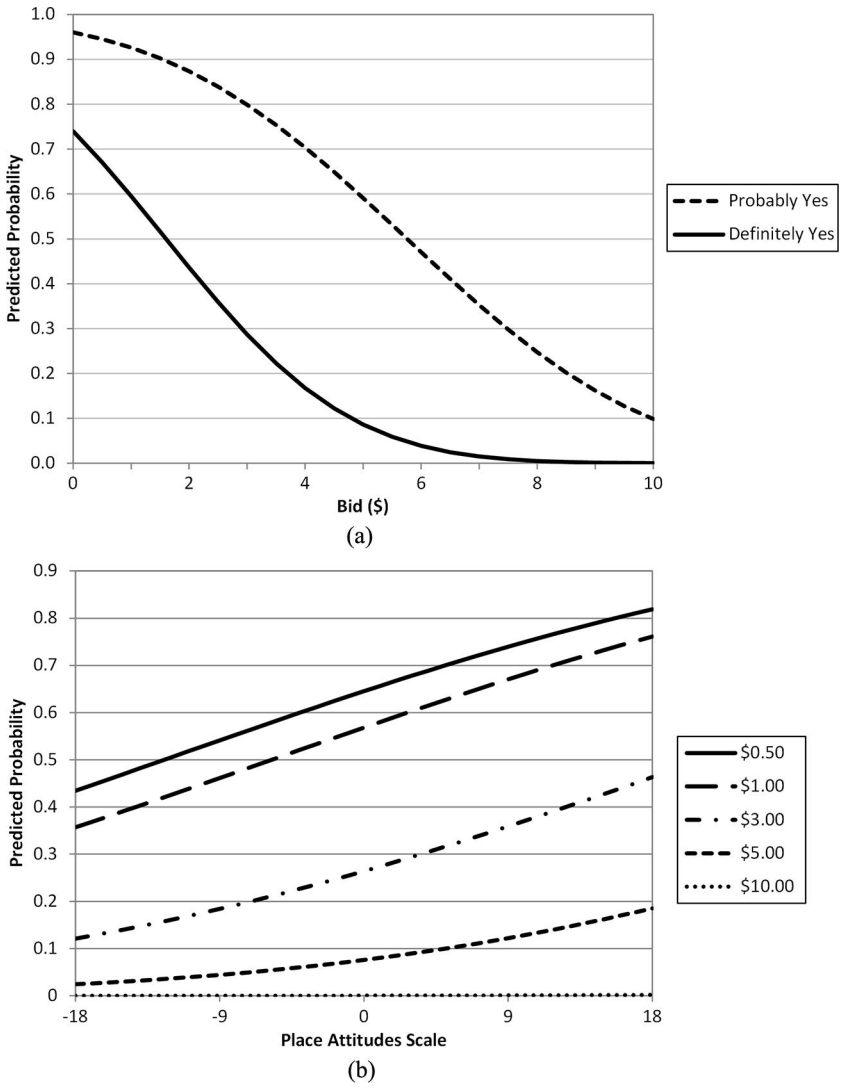

Figure 2. Estimated probabilities that water utility ratepayers are willing to pay (WTP) on their monthly water bill for a watershed protection program in the McKenzie River watershed. (a) Distribution of predicted probabilities that respondents were definitely (solid line) and probably (dashed line) WTP by bid amount. (b) Distribution of predicted probabilities that respondents were definitely WTP by place attitude score at different bid amounts.

probably WTP model indicates the sensitivity of the model to the response recoding. In addition, the predictive capacity (R^2) of the definitely WTP model is nearly 30% greater than that of the probably WTP model, indicating that greater confidence in responses to the definitely yes choice provides important added information to the model.

Additional Influences on Willingness to Pay

In addition to the bid level, the covariates control for place attitudes, awareness of the McKenzie River as the source of drinking water, use, survey mode, and respondent

demographics, including income, political ideology, gender, age, and education (Table 4). Examination of the models reveals that the bid level is not necessarily the most influential variable predicting the probability of being WTP. Although the bid amount had the greatest average marginal effect in the probably WTP model (−8.62% per dollar of bid increase), other variables had greater effects in the definitely WTP model. Place attitudes and political ideology both had greater average marginal effects (AME) when measured at the questionnaire anchor points than did the bid amount measured in $1.00 increments (11.18% and −8.37% vs −7.39%, respectively). The regression predicts higher probabilities of being WTP at all bid amounts as one's place attitude score increases (Figure 2b). In addition, controlling for the bid amount, WTP increases at an increasing rate for higher bid amounts as place attitudes become more positive.

Nearly three-quarters of respondents who self-identified with a liberal political ideology were WTP at least $0.50 monthly on their water bill, and this finding held across all income categories for politically liberal respondents. Over two-thirds of those who were not WTP at least $0.50 monthly self-identified as politically conservative (see Supplementary material, Table S2). Other variables with significant influence on the probability of being definitely WTP had AME that ranged from 0.25% for frequency of use (measured in weekly increments) to a 5.77% marginal effect resulting from responding to the questionnaire online as opposed to mail. In addition, income, education, age, and awareness of the McKenzie River as the drinking water source all had significant effects on respondents' probability of being definitely WTP for a water quality program in the McKenzie River watershed. Finally, we note that, our place attitude score was moderately correlated with respondents' use of the McKenzie River watershed ($\rho = 0.40$; $p < 0.001$); we revisit this point in the discussion.

Discussion

In this study, we tested a hypothesis focused on the influence of place-based attitudes on WTP for ecosystem services in Oregon's McKenzie River watershed. Our hypothesis was confirmed, and shows that the connections respondents had to their source watershed exerted a positive influence on WTP for a local water quality protection program. Further, the average marginal effect of place attitudes for the McKenzie River watershed on the definitely WTP model was greater in absolute magnitude than the average marginal effect of all other variables, including the bid amount. The positive average marginal effect for place attitudes contrasted the effects of other variables like the bid amount and conservative political ideologies, which had negative marginal effects. Results incorporating respondent certainty were consistent with what has been established in other contingent valuation research (Champ et al. 1997; Shaikh, Sun, and Cornelius van Kooten 2007) demonstrating the degree to which respondents are much less likely to select definitely yes on a multiple bounded discrete choice exercise. Given the uncertainty surrounding the "probably would" pay response, environmental managers should not equate general leanings of support with willingness to pay. Our results show that the multiple bounded discrete choice approach clearly differentiates WTP probabilities between being generally supportive and having certainty in one's evaluation of their willingness to pay. Managers should evaluate the level of uncertainty they are willing to accept in determining how to value a PWS program and take guidance from data like that presented in Figure 2a.

These findings suggest two main contributions to the field of research and practice on place-based attitudes and behavioral intentions. First, attitude theory (Eagly and Chaiken 1998) is relevant to the behavioral intentions people express toward managing and supporting the environmental quality of specific places. We find that place-based attitudes are not only important to understanding intended place-protective behavior, but that they also have financial value as demonstrated by an increase in probability people are WTP greater amounts for place-based ecosystem services from places that they have positive attitudes toward.

Second, environmental managers may be able to influence some aspects of a target population's WTP for ecosystem services through communication strategies that build on the population's attachment, identity, and behavioral dependence with the place in question. In addition, the correlation between place-based attitudes and use suggests that experiential programs designed to develop attachments, create identity, or encourage specific behaviors (like hiking in the watershed) may enhance or develop one's place-specific attitudes, which could then lead to greater support for the ecosystem services provided. Although the average marginal effect of the frequency of use on WTP is relatively minor, we note that the AME for frequency of use was measured in weekly increments meaning that small increases in the frequency of use (e.g., from annually to quarterly) add up to more substantial effects. Furthermore, the source of meaning that people associate with the McKenzie River watershed may vary based on one's sociocultural or political–economic relationship with the McKenzie River in addition to one's psychological connection to its biophysical features (Ardoin, Schuh, and Gould 2012). EWEB ratepayers reported that passing through and working were two of the most common uses suggesting that residents may develop place attitudes for the McKenzie River watershed based on meanings associated with those activities rather than frequent recreation or other leisure excursions.

Unlike the other variables considered in our analysis, such as political ideology, income, age, and gender, which cannot typically be altered by environmental managers, place-based attitudes are not static but rather a product of social construction (Greider and Garkovich 1994; Stokowski 2002). Communicating with a target population in a manner that draws on their connection to the place in question could increase the likelihood or amount that people support local environmental programs. In Munich, Germany, for example, the water utility partnered with local agricultural producers to convert to organic production methods and then initiated a promotional campaign aimed at encouraging Munich residents to buy locally sourced products for the benefit of their region and their water supply (Grolleau and McCann 2012). Motivational communication was also highlighted by Corral-Verdugo et al. (2002) as an important response to urban water waste in Sonora, Mexico. Communication in media, newsletters, websites, or utility bills that focuses on peoples' place connections could be an important strategy for environmental managers developing ecosystem services programs like the McKenzie River watershed VIP.

Communication strategies can be tailored to the specific PWS context. They may be as simple as seeking to increase awareness of rivers and watersheds as drinking water sources—a characteristic that independently elevated the probability of being WTP in our study. Or communication strategies may highlight opportunities for individuals to experience their drinking water source (for recreation, leisure, or education), which can

increase emotional bonds and encourage place-protective behaviors (Altman and Low 1992; Halpenny 2010). Building these experiential connections can help develop and strengthen place-based attitudes, and increase the value of place—both psychologically and economically. Managers might also consider trying to "brand" places through programs like "landscape labeling" that build a place-based identity signifying a broad ecosystem service value. Ghazoul, Garcia, and Kushalappa (2011) highlight a number of initiatives from Latin America to Africa using this strategy. While some may view these suggestions in the vein of Kosoy and Corbera's (2010) commodity fetishism or other critiques, we argue that communications designed to highlight people's connections to the places PES initiatives benefit may help PES buyers (e.g., urban water users) better act on their values by supporting initiatives that protect places they care about. Furthermore, initiatives like the McKenzie River VIP program recognize PES sellers (e.g., watershed landowners) as stewards, a potential cultural bridge in places with strained urban and rural relationships.

While place-based attitudes were important in our study, the generalizability of our findings beyond the population of EWEB customers is a limitation of our research. Place attitude measures have demonstrated general validity across cultural contexts and have been tested in a variety of countries ranging from Malaysia (Mazloomi, Ariffin, and Shahminan 2014) to China and Australia (Qian, Zhu, and Liu 2011; Chen, Dwyer, and Firth 2015). We recommend examining the importance of place to WTP in other geographic locations to better understand the broader application of this construct to environmental management and conservation finance, including in developing countries where PES initiatives have grown rapidly (Brouwer, Tesfaye, and Pauw 2011; Bennett, Carroll, and Hamilton 2013). Further research could also examine whether a revealed preference approach would yield the same results (e.g., soliciting actual donations through a program opt-in or opt-out option on ratepayers water bills). Demonstrating the linkage between perceptions and behavior, Corral-Verdugo et al. (2002) showed that Mexicans' water waste was higher if individual's perceived others to be wasting water. Whether place attitudes have an effect on observed economic behavior has not been tested to our knowledge in the revealed preference literature. Finally, we note that PES programs require engagement from both buyers and sellers; the EWEB VIP program emerged because watershed landowners were concerned about the effects of a regulatory approach to riparian and floodplain management. The extent to which McKenzie River watershed landowners are willing to act as sellers in a PES-like alternative to regulation and whether place attitudes play a role in those decisions is also a product for future research.

Conclusion

EWEB's development of the VIP was an outgrowth of community conflict over an attempt to regulate riparian and floodplain management (Cooper 2010; Lurie et al. 2013). To this end, we characterize source water protection programs as an approach to formalizing a partnership between watershed landowners and downstream populations that receive drinking water. We find that the connection between place and WTP goes beyond its theoretical importance, as people with more positive place attitudes were WTP more for watershed services provided by the McKenzie River.

This finding has implications for applied efforts in implementing PWS and environmental policy more generally. Our results confirm a tried and true strategy of many environmental campaigns—place matters—and highlight the value in the emotional, cognitive, and behavioral sentiments people have toward place. Further, we note that these sentiments are not static constructs, but could be influenced through targeted interventions to increase people's connections to places like their municipal watershed. Whether targeted interventions focused on increasing people's connections to places results in greater program success is an area for future research.

Notes

1. Census tracts are geographical subdivisions of a US county or equivalent geopolitical entity typically containing between 1,200 and 8,000 people.
2. A small value was added to non-users' frequency score to compute the natural log.

Acknowledgements

We gratefully acknowledge the 406 Eugene Water and Electric Board ratepayers whose contributions made this research possible, and the Unites States Department of Agriculture, National Institute for Food and Agriculture program for financial support through award number 2011-67023-30108. We also greatly appreciate the thoughtful comments, insights and feedback of Karl Morgenstern, Cassandra Moseley, Sue Lurie, Eric White, Anita Morzillo, Sally Duncan, and the four anonymous reviewers whose contributions helped to greatly improve this manuscript.

ORCID

Max Nielsen-Pincus http://orcid.org/0000-0002-0847-4820

References

Ajzen, I. 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 50:179–211.

Altman, I., and S. M. Low. 1992. *Place attachment*. New York, NY: Plenum Press.

Ardoin, N. M., J. S. Schuh, and R. K. Gould. 2012. Exploring the dimensions of place: A confirmatory factor analysis of data from three ecoregional sites. *Environmental Education Research* 18 (5):583–607.

Bateman, I., and D. Dupont. 2010. Political affiliation and willingness-to-pay for publicly versus privately provided environmental goods. CSERGR Working Paper EDM 10–09, Norwich, UK: Centre for Social and Economic Research on the Global Environment.

Bennett, D. E., H. Gosnell, S. Lurie, and S. Duncan. 2014. Utility engagement with payments for watershed services in the United States. *Ecosystem Services* 8:56–64.

Bennett, G., N. Carroll, and K. Hamilton. 2013. *Charting new waters: State of watershed payments 2012*. Washington, DC: Forest Trends.

Brouwer, R., A. Tesfaye, and P. Pauw. 2011. Meta-analysis of institutional-economic factors explaining the environmental performance of payments for watershed services. *Environmental Conservation* 38 (4):380–92.

Brown, G., P. Reed, and C. C. Harris. 2002. Testing a place-based theory for environmental evaluation: An Alaska case study. *Applied Geography* 22:49–76.

Carson, R. 2011. *Contingent valuation: A comprehensive bibliography and history*. Northhampton, MA: Edward Elgar Publishing.

Carson, R. T., N. E. Flores, and N. F. Meade. 2001. Contingent valuation: Controversies and evidence. *Environmental and Resource Economics* 19 (2):173–210.
Champ, P. A., R. C. Bishop, T. C. Brown, and D. W. McCollum. 1997. Using donation mechanisms to value nonuse benefits from public goods. *Journal of Environmental Economics and Management* 33:151–62.
Chen, N., L. Dwyer, and T. Firth. 2015. Factors influencing Chinese students' behavior in promoting Australia as a destination for Chinese outbound travel. *Journal of Travel & Tourism Marketing* 32 (4):366–81.
Community Planning Workshop (CPW). 2013. *An evaluation of utility ratepayer and landowner perceptions of a payment for ecosystem services program in the McKenzie River Basin*. Eugene, OR: University of Oregon.
Cooper, M. (2010, November 14). A river of discontent. The Register-Guard, p. A1.
Corral-Verdugo, V., M. Frias-Armenta, F. Pérez-Urias, V. Orduña-Cabrera, and N. Espinoza-Gallego. 2002. Residential water consumption, motivation for conserving water and the continuing tragedy of the commons. *Environmental management* 30 (4):527–35.
Devine-Wright, P. 2011. Place attachment and public acceptance of renewable energy: A tidal energy case study. *Journal of Environmental Psychology* 31 (4):336–43.
Dillman, D. A. 2000. *Mail and internet surveys: The tailored design method*. New York: John Wiley and Sons.
Dunlap, R. E. 1975. The impact of political orientation on environmental attitudes and actions. *Environment and Behavior* 7 (4):428–54.
Dupont, D. P., and I. J. Bateman. 2012. Political affiliation and willingness to pay: An examination of the nature of benefits and means of provision. *Ecological Economics* 75:43–51.
Eagly, A. H., and S. Chaiken. 1998. Attitude structure and function. In *The handbook of social psychology*, ed. D. T. Gilbert, S. T. Fiske, and G. Lindzey, 269–322. New York, NY: Oxford University Press.
Engel, S., S. Pagiola, and S. Wunder. 2008. Designing payments for environmental services in theory and practice: An overview of the issues. *Ecological Economics* 65 (4):663–74.
Ernston, H., and S. Sörlin. 2013. Ecosystem services as technology of globalization: On articulating values in urban nature. *Ecological Economics* 86:274–84.
Eugene Water and Electric Board (EWEB). 2011. *McKenzie river watershed baseline monitoring report*. Eugene, OR: EWEB.
Flores, N. E., and R. T. Carson. 1997. The relationship between the income elasticities of demand and willingness to pay. *Journal of Environmental Economics and Management* 33 (3):287–95.
Ghazoul, J., C. A. Garcia, and C. G. Kushalappa. 2011. *Landscape labeling approaches to PES: Bundling services, products and stewards*. Rome, Italy: FAO.
Goldman-Benner, R. L., S. Benitez, T. Boucher, A. Calvache, G. Daily, P. Kareiva, T. Kroeger, and A. Ramos. 2012. Water funds and payments for ecosystem services: Practice learns from theory and theory can learn from practice. *Oryx* 46 (1):55–63.
Greene, W. H. 2012. *Econometric analysis*. 7th ed. Upper Saddle River, NJ: Prentice Hall.
Greider, T., and L. Garkovich. 1994. Landscapes: The social construction of nature and the environment. *Rural Sociology* 59 (1):1–24.
Groenfeldt, D., and J. J. Schmidt. 2013. Ethics and water governance. *Ecology and Society* 18 (1):14.
Grolleau, G., and L. M. J. McCann. 2012. Designing watershed programs to pay farmers for water quality services: Case studies of Munich and New York City. *Ecological Economics* 76:87–94.
Hailu, G., P. C. Boxall, and B. L. McFarlane. 2005. The influence of place attachment on recreation demand. *Journal of Economic Psychology* 26:581–98.
Halpenny, E. A. 2010. Pro-environmental behaviours and park visitors: The effect of place attachment. *Journal of Environmental Psychology* 30 (4):409–21.
Jones, R. E., and R. Dunlap. 1992. The social bases of environmental concern: Have there been any changes. *Rural Sociology* 57 (1):28–47.
Jorgensen, B. S., and R. C. Stedman. 2001. Sense of place as an attitude: Lakeshore owners attitudes toward their properties. *Journal of Environmental Psychology* 21 (3):233–48.

Jorgensen, B. S., and R. C. Stedman. 2006. A comparative analysis of predictors of sense of place dimensions: Attachment to, dependence on, and identification with lakeshore properties. *Journal of Environmental Management* 79 (3):316–27.
Kinzig, A. P., C. Perrings, F. S. Chapin, S., III, Polasky, V. K. Smith, D. Tilman, and B. L. Turner. 2011. Paying for ecosystem services - promise and peril. *Science* 334 (6056):603–04.
Kosoy, N., and E. Corbera. 2010. Payments for ecosystem services as commodity fetishism. *Ecological Economics* 69:1228–36.
Kosoy, N., M. Martinez-Tuna, R. Muradian, and J. Martinez-Alier. 2007. Payments for environmental services in watersheds: Insights from a comparative study of three cases in Central America. *Ecological Economics* 61 (2–3):446–55.
Kyle, G., A. Graefe, and R. Manning. 2005. Testing the dimensionality of place attachment in recreational settings. *Environment and Behavior* 37 (2):153–77.
Larson, L. R., J. W. Whiting, G. T. Green, and J. Bowker. 2012. Visitor support for recreation fees in Georgia state parks. Proceedings of the 2012 Northeastern Recreation Research Symposium. Cooperstown, NY.
Lurie, S., D. E. Bennett, S. Duncan, H. Gosnell, M. L. Hunter, A. T. Morzillo, C. Moseley, M. Nielsen-Pincus, R. Parker, and E. M. White. 2013. PES marketplace development at the local scale: The Eugene Water and Electric Board as a local watershed services marketplace driver. *Ecosystem Services* 6:93–103.
Martin-Ortega, J., E. Ojea, and C. Roux. 2013. Payments for water ecosystem services in Latin America: A literature review and conceptual model. *Ecosystem Services* 6:122–32.
Mazloomi, S. M., S. I. Ariffin, and R. N. R. Shahminan. 2014. A comparative analysis of perceptual and demographic predictors of sense of place dimensions in the State Mosques of Malaysia. *Asian Journal of Social Psychology* 17 (2):128–40.
Miller, H. P. 1966. *Income distribution in the United States (A 1960 Census Monograph)*. Washington, DC: U.S. Department of Commerce.
Morrison, M., and D. J. Dowell. 2015. Sense of place and willingness to pay: Complementary concepts when evaluating contributions of cultural resources to regional communities. *Regional Studies* 49 (8):1374–86.
Muradian, R., E. Corbera, U. Pascual, N. Kosoy, and P. H. May. 2010. Reconciling theory and practice: An alternative conceptual framework for understanding payments for environmental services. *Ecological Economics* 69 (6):1202–08.
Neumayer, E. 2004. The environment, left-wing political orientation and ecological economics. *Ecological Economics* 51 (3):167–75.
Nielsen-Pincus, M., T. Hall, J. E. Force, and J. D. Wulfhorst. 2010. Sociodemographic effects on place bonding. *Journal of Environmental Psychology* 30 (4):443–54.
Pate, J., and J. Loomis. 1997. The effect of distance on willingness to pay values: A case study of wetlands and salmon in California. *Ecological Economics* 20 (3):199–207.
Pocewicz, A., and M. Nielsen-Pincus. 2013. Preferences of Wyoming residents for siting of energy and residential development. *Applied Geography* 43:45–55.
Postel, S. L., and B. H. Thompson Jr. 2005. Watershed protection: Capturing the benefits of nature's water supply services. *Natural Resources Forum* 29:98–108.
Proshansky, H. M., A. K. Fabian, and R. Kaminoff. 1983. Place-identity: Physical world socialization of the self. *Journal of Environmental Psychology* 3 (1):57–83.
Qian, J., H. Zhu, and Y. Liu. 2011. Investigating urban migrants' sense of place through a multi-scalar perspective. *Journal of Environmental Psychology* 31 (2):170–83.
Shaikh, S. L., L. Sun, and G. Cornelius van Kooten. 2007. Treating respondent uncertainty in contingent valuation: A comparison of empirical treatments. *Ecological Economics* 62:115–25.
Stanton, T., E. Echavarria, K. Hamilton, and C. Ott. 2010. *State of watershed payments: An emerging marketplace*. Washington, DC: Ecosystem Marketplace.
Stedman, R. C. 2002. Toward a social psychology of place predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behavior* 34 (5):561–81.
Stokowski, P. A. 2002. Languages of place and discourses of power: Constructing new senses of place. *Journal of Leisure Research* 34 (4):368–382.

Tallis, H., P. Kareiva, M. Marvier, and A. Chang. 2008. An ecosystem services framework to support both practical conservation and economic development. *Proceedings of the National Academy of Sciences of the United States of America* 105 (28):9457–64.

Tuan, Y.-F. 1975. Place: an experiential perspective. *The Geographical Review* 65:151–65.

Tucker, D., B. S. Jorgensen, B. E. Nancarrow, Z. Leviston, and C. S. Johnston. 2006. *Sense of place: Towards a methodology to value externalities associated with urban water systems*. Perth, Australia: CSIRO.

United States Census Bureau (USCB). 2012. *Table B15001. American Community Survey*. Washington, DC: USCB.

Vaske, J. J., and K. C. Kobrin. 2001. Place attachment and environmentally responsible behavior. *The Journal of Environmental Education* 32 (4):16–21.

Vatn, A. 2010. An institutional analysis of payments for environmental services. *Ecological Economics* 69 (6):1245–52.

Welsh, M. P., and G. L. Poe. 1998. Elicitation Effects in Contingent Valuation: Comparisons to a Multiple Bounded Discrete Choice Approach. *Journal of Environmental Economics and Management* 36:170–85.

Williams, D. R., and J. J. Vaske. 2003. The measurement of place attachment: Validity and generalizability of a psychometric approach. *Forest Science* 49 (6):830–40.

Wunder, S. 2005. Payments for environmental services: Some nuts and bolts. Occasional paper no. 42. Bogor Barat, Indonesia: Center for International Forestry Research (CIFOR).

Zia, A., B. G. Norton, S. S. Metcalf, P. D. Hirsch, and B. M. Hannon. 2014. Spatial discounting, place attachment, and environmental concern: Toward an ambit-based theory of sense of place. *Journal of Environmental Psychology* 40:283–95.