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Willingness to contribute to the management of recreational quality on private lands in Finland

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Abstract

In Finland, privately owned nature areas are widely used for recreation due to open public access. However, since landowners are not obligated to take everyman's rights into consideration when making management decisions, the recreational quality of nature areas is not guaranteed for users. We examined whether individual recreationists on private lands would be willing purchase management actions from landowners that influence recreational quality. In addition to willingness to pay, we assessed willingness to contribute labor to such actions. The results demonstrated that about half of the recreationists who participated in our survey were willing to contribute labor and about 10% were willing to pay to direct the management of their typical recreation site on private lands. The mean willingness to pay was 92 euros per year and the mean willingness to contribute labor 3.5 days per year. A latent class regression model revealed that recreationists were not, however, completely homogeneous in their preferences for the actions or in their preferred contribution forms. On the basis of the results, there is moderate demand from recreationists for management to improve recreational quality and the potential for local landscape management arrangements that allow individual recreationists to contribute labor.

Keywords: Payments for ecosystem services; Recreation; Willingness to pay; Willingness to contribute labor; Contingent valuation

1. Introduction

Two out of three adult Finns annually use privately owned nature areas for recreation (Silvennoinen and Sievänen 2011), and about 40% visit privately owned areas on a weekly basis. Approximately 250 million recreation visits per year are made by Finns to privately owned land or water areas. This is natural, as 70% of forest land is privately owned (Finnish Statistical Yearbook of Forestry 2011). The use of private land is related to the Nordic “everyman's right,” the traditional right of open access that basically covers walking, skiing and cycling freely in the countryside, camping temporarily, gathering wild foods and flowers, fishing with a rod and line, and using water areas for boating and swimming (Finnish Ministry of the Environment 2011). However, everyman's right does not guarantee the quality of the recreational environment on private lands and waters. For example, forest management such as thinning and clear-felling for timber production can take place in areas with a high recreational value. Taking into account the benefits of landscape management and preservation perceived by recreationists may increase the social benefits of natural areas.

An alternative to resolve the possible conflict between landowners and recreational users is payment for environmental services (PES). PES has been suggested as a flexible approach to guarantee the quality of the environment and the production of environmental services (Engel et al., 2008; Pagiola and Platais, 2007) with market-based incentives. Wunder (2005) defined PES as “a voluntary transaction where a well-defined environmental service (ES) is being ‘bought’ by a minimum of one service buyer from a minimum of one service provider if and only if the service provider secures service provision.” PES examples are abundant in the literature (for a review, see Whittington and Pagiola 2012, Tacconi 2012). However, PES schemes are in most cases ‘government-financed’ rather than ‘user-financed’ programs which are likely to be efficiently targeted at those actions and sites that produce the most benefits with the lowest costs (Grammatikopoulou et al. 2013). To evaluate the feasibility of a PES scheme, it is particularly important to know whether the price providers demand a match with the offers of the buyers (Wunder 2007). In this study we focused on local user-financed PES in the recreational environment from the buyers’ point of view.

Previous case studies concerning PES schemes for recreation services are rather rare in the literature, and they usually comprise an ex-post valuation of a PES scheme and a review of the relevant implementation (see Hackl et al., 2007; Dobbs and Pretty, 2008). Hackl et al. (2007) concluded that further research is needed to investigate how local compensation schemes could be implemented in non-tourist communities. As far as we know, there have been few studies considering individual buyers in PES schemes (van Dam 2011), and none regarding recreation ecosystem services.

In Finland, recreation-based PES schemes have been implemented with the Finnish forest service as a seller of the services and nature tourism companies as buyers (Kniivilä et al. 2011). To enhance the PES schemes between individual buyers and landowners, forest extension services have sketched agreement guidelines, but actual agreements have been very rare. One reason for this may be that it is not culturally accepted or common to use money as a measure of exchange in rural areas between landowners and recreational home owners, or between locals and landowners. Instead, it may be more socially acceptable to exchange invisibles or services (Pacione 1997). Contributing time and labor instead of money has been an issue in stated preference studies for the developing world (Asrat et al. 2004, Tilahun et al. 2011), but a less studied topic in the literature related to PES.

In this study, we used a survey of recreationists on private land to consider individual recreationists as buyers of environmental quality for recreation in Finland. We were particularly interested in defining the characteristics of the segments of potential buyers, as well as the nature management acts that they are interested in. We analyzed their willingness to pay for these selected management options. As in many cases the demanded landscape

management can involve very small-scale acts, often in close proximity to private recreational homes, we also examined whether participation in practical work as part of nature management, i.e. the contribution of time, would be a more preferred “payment” method for improving the quality of the environment for recreation. We also examined the heterogeneity of buyers with respect to their preferences for the payment method, i.e. time or money.

2. Previous literature: willingness to spend money or work for environmental quality

To estimate how much recreationists would be willing to pay for the quality of recreational services, we applied the contingent valuation method (CVM). CVM is a widely used technique to measure the monetary value of changes in the provision of public goods such as recreation amenities, wildlife and environmental quality (Mitchell & Carson 1989, Boyle 2003). In a contingent valuation study, respondents are asked about their willingness to pay for a realistic but hypothetical improvement in an environmental amenity. Respectively, respondents can be asked about the minimum amount of compensation they would be willing to accept for a decrease in quality or quantity of an environmental amenity. Here, our aim is to assess recreationists’ willingness to pay for forest management actions that improve recreational quality, and in addition their willingness to pay for a postponement of 10 years in forest management actions that harm recreational quality.

In addition to measuring willingness to pay in terms of cash, labor has also been used as utility measure. This is especially so in developing countries, where in some cases due to tight budgets, households cannot give up any part of their income for public projects. To avoid this problem, authors have suggested the use of contributed labor (or other in-kind payments such as rice) to better measure the benefits (Asrat et al. 2004, Tilahun et al. 2011). For example, Asrat et al. (2004) analyzed farmers’ WTP for soil conservation practices in terms of both labor and money, and Tilahun et al. (2011) investigated whether rural households are willing to contribute cash or labor for *Boswellia papyrifera* forest conservation in Ethiopia.

Labor is not, however, as easily and straightforwardly convertible into utility as money since willingness to pay in terms of labor depends not only on the project but also on the type of work that has to be done and on the working circumstances (Alheim et al. 2010). This has reduced the interest in using labor contribution in contingent valuation studies in the developed world, where the problem of excessively tight budget constraints does not usually exist. Still, it is interesting to examine whether citizens would be willing to carry out volunteer work for environmental issues. Individuals have shown interest in voluntarily participating in environmental monitoring in several cases (Danielsen et al. 2007, Newman et al. 2003, Toms et al. 1999). The potential of volunteerism has additionally been noted in the management of national parks (Bremer & Graeff 2007). In the case where people do not want to pay forest owners for management practices, would they instead be willing to volunteer work and participate in the realization of the actions? Vesley (2007) conducted a CV study on citizens’ willingness to pay to avoid a loss in the amount of urban forests in New Zealand. In addition to willingness to pay in cash, they asked whether respondents would be willing to contribute 4 hours of volunteer work per year. Over half of the respondents who refused to pay in monetary units accepted the contribution of labor.

3. Methods

Data

Statistics Finland collected data for the Finnish national outdoor recreation demand inventory (LVVI), a comprehensive survey (8895 respondents in total) measuring outdoor recreation in Finland. A random sample of Finns aged 15 to 74 years was drawn from the Census of Finland. The study reported here was based on data from two survey rounds collected in May to June and September to November 2010. The sample size for this sub-

sample was 8000 persons, and 2761 persons responded to the survey, giving a response rate of 34.5%. The data were collected using an Internet survey supported by a mail questionnaire (mixed-mode method). The number of responses was 1693 (61% of the total responses) in Internet survey and 1068 (39% of the total responses) in the mail survey. Based on a non-response study (n=301, response rate 41.8%) was carried out in December 2010, non-respondents did not significantly differ according to their participation in outdoor recreation from those who responded to the survey.

Variables

The data provided information on the participation of Finns in nature-based recreation in general, but also in privately owned land and water areas. If respondents used private lands for recreation they were asked questions about the privately owned area they had visited most during the previous 12 months, i.e. their typical destination (knowledge of the owner of the area, number of visits, distance travelled to area), and also the characteristics of a typical visit (duration of the visit, outdoor activity, and visit companions).

The PES-related questions were preceded by questions on attitudes towards eleven different management actions in the typical destination (Table 1). The scale of responses was “action is desirable” (1), “action is undesirable” (2), and “not possible to implement OR cannot say” (3). After asking the respondents about their general attitudes toward the practices, they were asked whether they would like to contribute to the practices. For each action respondents found desirable, they were asked whether they would like to pay for the practice or contribute labor to it. The response options were “I would pay the landowner for the management action” (1), “I would use my own time to conduct the management action” (2), and “Not willing to contribute time or money OR there is no possibility to influence the management action” (3). With regards the actions respondents found undesirable, they were asked whether they would like to pay for a postponement of 10 years. The response options were “I would be willing to pay for the postponement of the management actions for 10 years” (1) and “Not willing to OR There is no possibility to influence the management action” (2). The distributions of the responses to these questions are presented in Table 1.

Table 1 first presents the respondents’ attitudes towards the management actions. Clear-cuts stood out as a practice that was found undesirable by most of those respondents who rated the practice. Storing stumps and logging residues in the forest and the reforestation of fields were also more often found undesirable than desirable. Removing deadwood and decayed wood divided the respondents, as approximately as many found it desirable as undesirable. The majority of the respondents found the rest of the practices desirable, with the most commonly desirable practice being the management of shores and water systems.

The table next presents the proportions of respondents willing to contribute to the actions they found desirable/undesirable¹. Respondents appeared to be more willing to contribute labor than money. The management of shores and water systems was the practice respondents were most commonly willing to pay for, but the proportion of respondents willing to pay for it was nevertheless only 6%. However, for each of the actions, at least a quarter of the respondents were willing to contribute labor.

Paying for the postponement of undesirable practices turned out to be slightly more popular than paying for the implementation of desirable actions. However, with regards to each of the practices, over 90% of the respondents finding the practices undesirable were unwilling or unable to contribute. Respondents were most interested in paying for a delay in

¹ In the case of clear-cuts and storing stumps and logging residues in the forest, the contribution of payment and labor for the realization of the practice were not given as alternatives. Willingness to pay to carry them out was assumed very unlikely based on previous literature (e.g. Silvennoinen et al. 2002, Tyrväinen et al. 2003, Karjalainen 2006). The contribution of labor was not possible because of the nature of logging work in clear-cuttings.

clear-cuts, with about 10% of respondents finding this undesirable being willing to pay to postpone it. In total, 53% of the respondents were willing to contribute money or labor to at least one action. While 13% were willing to pay for actions, half were willing to contribute labor.

Table 1. Attitudes towards management actions and willingness to contribute to them.

Management actions	Share of respondents finding the action desirable/undesirable, %		Share of respondents willing to contribute to actions they found desirable/undesirable, %		N
			Willing to pay	Willing to contribute labor	
Clear-cutting of forest	Desirable	4.2	-	-	1508
	Undesirable	66.5	9.4	-	
	Not possible/cannot say	29.4	-	-	
Forest thinning	Desirable	45.9	2.4	29.5	1496
	Undesirable	25.4	7.9	-	
	Not possible/cannot say	28.7	-	-	
Reforestation of fields	Desirable	9.9	5.4	26.1	1470
	Undesirable	36.0	5.0	-	
	Not possible/cannot say	54.1	-	-	
Storing stumps and logging residues (energy wood) in the forest	Desirable	15.4	-	-	1476
	Undesirable	44.9	5.5	-	
	Not possible/cannot say	39.7	-	-	
Clearing young stands and thickets	Desirable	58.3	2.0	35.7	1500
	Undesirable	14.7	5.6	-	
	Not possible/can't say	27.0	-	-	
Removing trees and bushes to open the landscape	Desirable	44.2	1.7	40.2	1483
	Undesirable	29.5	6.3	-	
	Not possible/cannot say	26.3	-	-	
Collecting logging waste and sticks from terrain	Desirable	57.1	2.4	44.1	1501
	Undesirable	17.3	6.4	-	
	Not possible/cannot say	25.6	-	-	
Removing deadwood and decayed wood	Desirable	36.2	1.9	42.4	1491
	Undesirable	39.7	5.4	-	
	Not possible/cannot say	24.1	-	-	
Management of fields and meadows	Desirable	54.5	2.6	26.4	1485
	Undesirable	7.6	8.5	-	
	Not possible/cannot say	37.9	-	-	
Management of shores and water systems	Desirable	65.1	6.2	38.4	1496
	Undesirable	5.7	8.1	-	
	Not possible/cannot say	29.2	-	-	
Restoring trails	Desirable	46.2	4.6	39.1	1490
	Undesirable	17.4	5.2	-	
	Not possible/cannot say	36.4	-	-	

Finally, those respondents who had answered that they would be willing to contribute to at least one action were asked to tell how much they would be willing to contribute. Willingness to pay (WTP) was elicited using a payment card, where respondents were presented with a list of ordered payments and were asked to circle the maximum amount they would pay for the management actions they chose. In the case of willingness to contribute labor, the respondents were asked the maximum time they would spend on the actions of their choice. The presented amounts of money ranged between €10 and €500 per year, and the time contribution between 6 hours and seven days per year. Respondents could also choose zero for WTP in terms of both money and time. Table 3 presents the distributions of the responses to the WTP questions.

Table 3. WTP for the actions in terms of money or labor.

WTP for forest management actions	For realization of the actions	For postponement of the actions	For realization of the actions	
In money (€/year)	% of respondents	% of respondents	In labor (days/year)	% of respondents
0	5	20.5	0	1.3
10	23	12.5	0.5	5.3
25	16	14.8	1	12.2
50	19	14.8	2	17.7
75	2	21.6	3	15.1
100	19	3.4	4	6.4
150	2	3.4	5	11.5
200	10	3.4	6	4.0
≥ 500	5	5.7	≥ 7	26.4
No. of observations	62	99	No. of observations	451

For independent variables, in addition to the typical socio-demographic background of the respondents, we measured attitudes towards PES. The seven statements measuring the perceptions of PES with a five-point Likert scale are presented in Appendix 1. The dimensions of the attitudes towards PES defined in factor analysis were the following. Factor 1 characterized respondents' positive attitudes towards landowner compensation either by sharing the cost between the recreationists and landowners or by using public or governmental support. This factor explained 28.7% of the total variance. Factor 2 was characterized by the opinion that there is no need for landscape management in the area. It also brought together variables that reflect the freedom of landowners to decide on the management of the area and negative attitudes towards sharing the management cost. Altogether, 15.9% of the total variance was explained. Factor 3 concerned landowner responsibility for taking care of landscape management, and explained 13.7% of the total variance. The factor scores based on this analysis were further applied in the model explaining participation in PES and WTP. However, Factor 2 was left out of the final models as it did not improve them significantly.

Statistical models

Logistic regression (e.g. Haab & McConnell 2002) was used to identify the characteristics of the segment of potential buyers who are interested in participating in trade over the quality of the recreational environment. The relative interest towards different management actions at a recreational site and the potential heterogeneity of the respondents regarding the contribution intentions was analyzed by *latent class multinomial regression modeling*. The idea of the latent class regression model is that behind the observed variables, an unobserved nominal variable, x , may exist that indicates separate subpopulations, each having their own distribution of the observed variables, y . Across these estimated subpopulations, the parameters of the regression model may differ (Wedel and DeSarbo 1994). The WTP functions based on the payment card data were estimated with the *interval data model* (Cameron & Hubbert, 1989).

4. Results

Willingness to participate

The logistic regression model for the willingness to contribute to at least one management action in terms of money or labor is presented in Table 4. Apart from income, only statistically significant variables were included in the model.

Table 4. Logit model for willingness to participate.

Variables	Logit
	Coefficient (z-statistic)
Income	0.000 (1.24)
Unknown forest owner	-0.853 (-3.82)***
Access to recreational home	0.706 (3.72)***
Visits to the area per year	-0.002 (-2.27)**
Number of different activities	0.083 (2.78)**
Factor 1 Positive towards landowner compensation	0.605 (5.34)***
Factor 3 Landowner has the right to decide how the area is managed or there is no need for landscape management	-1.037 (-6.06)***
Constant	-0.611 (-2.31)**
Pseudo-R ²	0.168
Observations	614

***p < 0.01, **p < 0.05, *p < 0.1

Respondents having access to a recreational home more often expressed willingness to participate than those without access to one. This may imply that in many cases the recreational sites of interest were in close vicinity to recreational homes. Respondents who did not know who owns the land less often expressed willingness to participate than others. A higher number of visits to the area reduced the probability of willingness to participate. This initially appears surprising, but it may stem from often-visited sites already having satisfying characteristics for recreation. The number of different activities respondents carried out in the area increased the probability of participation. The factors describing respondents' attitudes towards the landscape management of private lands (Appendix 1) also significantly associated with the willingness to participate. The factor describing a positive attitude towards landowner compensation increased the participation probability. The factor capturing the opinion that the landowner has the right to decide on how the area is managed, or that there is no need for landscape management, reduced the probability of participation.

Latent class regression

The latent class multinomial regression model revealed which management practices respondents were especially willing to pay for or contribute labor to (Table 5), as well as the potential heterogeneity among respondents regarding their choice of contribution form. The model explained the choice of participation form associated with the eleven management practices. The dependent variable was $Y = 1, 2, 3, 4$, where 1 = I do not want to participate, 2 = I would participate by contributing labor, 3 = I would pay for the postponement of an action and 4 = I would pay for the carrying out of an action. The explanatory variables consisted of the eleven suggested forest management practices.

Table 5 presents the latent class regression model for three segments that in our case, based on the Bayesian information criteria (BIC) 3-class model, performed best. **Class 1 – non-participants** encompassed the largest proportion, comprising 62% of the sample. These recreationists were the most reluctant to contribute, and 95% were not willing to contribute at all. **Class 2 – labor contributors** comprised 32% of the sample. This class consisted of those individuals who were most willing to contribute labor to management practices. About half of the class was willing to contribute labor, but the proportion of reluctant respondents was also rather high. **Class 3 – money contributors** was the smallest class, accounting for 6% of the sample. This class was most favorable towards the program: 19% of the class would contribute labor, 20% of the class was willing to pay for management actions, and 34% was willing to pay for the postponement of undesirable management activities.

Table 5. Latent class regression.

Latent class regression model		Class 1 Non-participants	Class 2 Labor contributors	Class 3 Money contributors	Overall			
Class size		61.7%	32.1%	6.3%				
Pseudo R ²		0.048	0.251	0.106	0.466			
Observations		913						
Dependent variable: Willing to contribute:								
Nothing		94.7%	47.1%	28.1%				
Labor for realization		4.6%	50.4%	18.6%				
Money for postponement		0.3%	1.8%	33.6%				
Money for realization		0.4%	0.7%	19.8%				
Predictors:								
Management actions	Response options	Coefficients			Wald	Wald (=)	Mean	SD
Intercept	Nothing	0	0	0	252.58***	47.52***	0	0
	Labor for realization	-3.98***	-2.56***	-1.17			-3.35	0.86
	Money for postponement	-5.67***	-3.80***	-0.60			-4.75	1.38
Clear-cutting of forest = 1	Nothing	-4.92***	-12.11	-1.46**	23.82***	0.31	-7.01	3.60
	Labor for realization	0	0	0			0	0
	Money for postponement	-7.10	-7.71	-6.01			-7.23	0.42
Forest thinning = 1	Nothing	1.66	1.60***	2.04***			1.67	0.10
	Labor for realization	-8.64	-0.63	-8.20	83.56***	20.19***	-6.04	3.72
	Money for postponement	0	0	0			0	0
Storing stumps and logging residues in the forest = 1	Nothing	-0.16	2.68***	0.28			0.78	1.31
	Labor for realization	-0.21	0.52	0.73			0.09	0.38
	Money for realization	-1.10	0.81	1.00			-0.35	0.94
Clearing young stands and thickets = 1	Nothing	-8.26	-0.27	-8.94	3.67	0.26	-5.74	3.76
	Labor for realization	0	0	0			0	0
	Money for postponement	-8.26	-0.27	-8.94	141.67***	25.79***	-5.74	3.76
Removing trees and bushes to open the landscape = 1	Nothing	0.16	3.71***	1.12			1.36	1.63
	Labor for realization	-7.24	-0.24	-0.05			-4.54	3.42
	Money for realization	-0.81	8.22	0.87	111.96***	16.76**	2.20	4.16
Collecting logging waste and sticks from terrain = 1	Nothing	0	0	0			0	0
	Labor for realization	0.56	3.14***	0.77			1.40	1.20
	Money for postponement	-0.39	-7.55	1.00*			-2.60	3.42
Removing deadwood and decayed wood = 1	Nothing	-8.70	8.41	0.587	170.36***	13.53**	-2.63	7.91
	Labor for realization	0	0	0			0	0
	Money for postponement	-8.70	8.41	0.587			-2.63	7.91
Management of fields and meadows = 1	Nothing	1.51**	3.92***	1.90**			2.31	1.12
	Labor for realization	-7.34	-6.25	1.04			-6.47	2.01
	Money for realization	-8.61	8.24	1.99***	75.70***	10.67*	-2.54	7.83
	Nothing	0	0	0			0	0
	Labor for realization	0.35	2.49***	0.93			1.07	0.99
	Money for postponement	-7.21	0.03	0.96*			-4.38	3.60
	Nothing	-8.65	7.30	0.53	95.88***	10.04	-2.97	7.38
	Labor for realization	0	0	0			0	0
	Money for postponement	0.70	2.82***	0.99			1.40	0.98
	Nothing	-7.18	-7.69	0.22			-6.88	1.85
	Labor for realization							
	Money for postponement							

Management of shores and water systems = 1	Money for realization	-8.46	7.74	1.61**	175.11***	8.45	-2.63	7.52
	Nothing	0	0	0			0.000	0.000
	Labor for realization	2.25***	3.69***	2.17**			2.71	0.68
Restoring trails = 1	Money for postponement	-1.27	-7.07	0.64	122.33***	1.05	-3.01	2.83
	Money for realization	1.30	10.38	2.91***			4.31	4.19
	Nothing	0	0	0			0.000	0.000
Reforestation of fields = 1 (reference)	Labor for realization	1.98***	3.08***	0.29	0	0	2.23	0.71
	Money for postponement	-0.11	-0.46	-0.20			-0.23	0.16
	Money for realization	0.82	8.20	1.29*			3.22	3.43
	Nothing	0	0	0			0.000	0.000
	Labor for realization	-0.29	0.62	-0.62			-0.02	0.45
	Money for postponement	0.29	0.29	0.50			0.30	0.05
	Money for realization	-0.63	-0.25	0.25			-0.45	0.25
Z statistic: ***p < 0.01, **p < 0.05, *p < 0.1								

Apart from the reference action, i.e. reforestation of fields, and storing logging waste and stumps in the forest, all actions had a statistically significant effect on the choice of preferred contribution form. Four of the nine statistically significant management actions did not differ statistically significantly in their effects between the classes (Wald=), those were: forest clear-cuts, restoration of trails, management of shores and water systems and management of fields and meadows. Clear-cutting affected positively the willingness of each class to pay for a postponement², and the effect was statistically significant for both labor contributors and money contributors. Management of shores and water systems had a statistically significant effect on each class's willingness to contribute labor and on the willingness of money contributors to pay for realization.

Restoring trails had in all the three classes a positive effect on the willingness of respondents to contribute labor. The effect was statistically significant for non-participants and labor contributors. For money contributors, the effect was positive and statistically significant in the case of paying for the realization of the practice. Management of fields and meadows had a positive effect on each class's willingness to contribute labor, but the effect was statistically significant only for labor contributors. In addition, the action had a statistically significant effect on the willingness of money contributors to pay for its realization.

According to the Wald(=) test, statistically significant differences in their effects between the classes existed with regards to forest thinning, clearing young stands and thickets, removing trees and bushes to open the landscape, collecting logging waste and sticks from the terrain and removing deadwood and decayed wood.

Removing deadwood and decayed wood and removing trees and bushes to open the landscape had a positive and statistically significant effect on the willingness of labor contributors to contribute labor and on the willingness of money contributors to pay for the postponement of the action. This reflects a potential conflict between preferences for biodiversity and the aesthetics of landscapes (Parsons 1995).

Regarding collecting logging waste, respondents wanted the practice to be implemented, but some wanted to pay for it and others to work for it. It had a positive and significant effect

² In the case of clear-cuts, payment and the contribution of labor for realization of the practice were not given as alternative choices. Willingness to pay for conducting clear-cuts was assumed very unlikely based on previous literature (e.g. Silvennoinen et al. 2002). The contribution of labor was not possible because of the nature of logging work in clear-cuttings.

on the willingness of each class to contribute labor, and in addition to this, a statistically significant positive effect on the willingness of money contributors to pay for realization of the practice. Forest thinning and clearing of young stands and thickets only associated statistically significantly with the willingness of labor contributors to contribute labor.

Willingness to pay

After identifying the management practices respondents were especially willing to pay for or spend time on, we modelled the willingness to pay for the actions in terms of cash and labor contribution.

Due to the rather small number of respondents to the WTP questions in terms of money, we estimated only one WTP model in terms of money, including answers to both the questions concerning willingness to pay for the realization of the actions and willingness to pay for the postponement of the actions. If a respondent had answered both questions, the response for the willingness to pay for realization was included in the model. The data included 62 responses for willingness to pay for the realization of the actions and 88 responses for willingness to pay for the postponement of the actions, from which 28 were overlapping observations. Altogether, 86 observations were available for modeling due to missing values for independent variables. The WTP models are presented in Table 7.

Table 7. Willingness to pay or contribute labor models.

Variables	In terms of money	In terms of labor
	Coefficient (t-value)	Coefficient (t-value)
Income	0.000 (1.67)*	-0.000 (-2.64)***
Age 35-44		0.617 (1.65)*
Age 45-64	-0.626 (-2.45)**	
Knows forest owner personally	0.764 (2.54)**	
Unknown forest owner		-1.035 (-2.56)**
Visits in the area per year		0.005 (2.33)**
Number of recreation activities taken in the area		0.101 (2.18)**
Number of forest related activities taken in the area	0.248 (2.82)***	
Number of management actions respondent is willing to contribute to	0.222 (2.67)***	0.508 (6.72)***
Constant	2.387 (5.06)***	2.895 (6.31)***
Observations	86	319
Pseudo-R ²	0.270	0.170

***p < 0.01, **p < 0.05, *p < 0.1

Table 7 presents first the model for willingness to pay in terms of money. As economic theory assumes, income had a positive and statistically significant effect on WTP. The effect was, however, very small. Respondents aged between 45 and 64 years were willing to pay less than other age classes. Willingness to pay was higher if respondent knew the forest owner personally. It was also higher the more forest-related outdoor activities the respondent had in the area. In addition, the number of management actions the respondent was willing to pay for increased the willingness to pay. A one-unit increase from the mean number (3) of management actions the respondent was willing to pay for would increase the WTP by a factor of 1.24, i.e. about 25%, when other variables are kept fixed. The marginal willingness to pay may in reality decrease as the number of actions an individual is willing to pay for increases.

Table 7 secondly presents the model for willingness to pay in terms of labor. Income negatively and statistically significantly affected WTP in terms of labor. This indicates the opportunity cost of time being higher for well-paid respondents, although the effect of income is also very small in this model. The respondents aged between 35 and 44 years were willing to spend more time on the management action than the others. Respondents who did not know who owned the forest were willing to spend less time than those who at least knew who the

owner was, even if they did not necessarily know him or her personally. The number of recreation visits to the particular area increased the willingness to spend time on the actions. In addition, the willingness to contribute labor was higher the more recreation activities the respondent participated in there. Furthermore, the number of management actions associated with a higher willingness to contribute in terms of labor. An one unit increase in the number of management actions a respondent is willing to contribute to would increase the willingness to contribute labor by half a day. The mean number of actions respondents were willing to contribute labor to was 3.

In the whole sample, the mean WTP in money was €92 per adult per year, and in labor it was 4.6 days per year (Table 8). From the three distinct classes, non-participants were willing to contribute least both in terms of money and labor. Labor contributors had the highest willingness to pay in terms of labor, and money contributors had highest willingness to pay in terms of money.

Table 8. Predicted mean willingness to pay in labor and money.

	Class 1	Class 2	Class 3			95% confidence interval
Predicted WTP/year	Non-participants	Labor contributors	Money contributors	χ^2 p-value	Mean	for mean WTP*
Labor, days	3.6	5.1	4.5	0.000	4.6	4.3-4.9
Money, euros	63.4	87.7	113.5	0.018	92.1	68.3-187.4

*Bootstrapped with 100 replications

The mean predicted WTP in labor transformed to a monetary value simply by multiplying the WTP in labor by the hourly wage rate of respondents (mean €15) is €557, which is six times the mean predicted WTP in money. Due to the problems related to the transformation of time to money (Alheim et al. 2010), the WTP estimates in money and labor are not, however, unambiguously comparable. Besides, WTP in labor is not necessarily usable as a utility measure, while WTP in money is. Nevertheless, this result suggests that individuals seem to be willing to give up more time than money for improvements in recreation quality.

5. Conclusions and discussion

In the light of these results, it seems that the recreational environment is an abundant good, or it is a special good with only limited demand in Finland, as only a very small proportion of the respondents were willing to pay for the management of privately owned lands or water areas. Nevertheless, recreationists' willingness to spend their own time, for example, in collecting logging waste and sticks from the forest might help to maintain and improve the recreational services on a smaller scale. In order to enable the utilization of individual recreationists as labor in landscape management practices, new forums for arrangements of this kind between recreationists and landowners would be needed. As the willingness to participate turned out to be more likely if a respondent knew who owned the land, informal relationships between landowners and recreationists would be important. An option to enhance social relationships that may lead to agreements about ecosystem management is to establish regional associations of property owners covering both recreational homeowners and landowners.

One potential problem in the practical implementation of this type of PES program in Finland may be that rural areas in Finland are very sparsely populated. Since people would probably only be willing to make an effort in the areas they use for recreation, it is apparent that there would be only very few individuals willing to contribute in any particular area. Therefore, purchases would probably concern small areas and transactions would cover only one buyer and one seller. On the other hand, contributions could be high enough close to

nature tourism attractions and in concentrations of leisure homes, where there are rather more beneficiaries and thus available resources in money and labor. Nevertheless, PES could be a mechanism to guarantee the recreational quality of private lands in areas where recreational benefits are highest.

Willingness to pay in terms of money varied in latent classes between €63–92 per year, and in terms of labor between 3.5–5 days per year. Further studies would be needed to determine the willingness to pay/spend time for each specific management action. As far as WTP in terms of money and labor can be compared, it appeared that the WTP of the respondents was higher in terms of labor than money. This indicates that doing things by oneself has value in itself. On the other hand, it indicates the fact that it seems to be easier to intend to spend time than money. The latent classes also revealed that the labor–money ratio may not be equal for all of the respondents. The class of participants interested in a monetary contribution comprised young recreationists. This might imply that younger people do not perceive the utility from nature work to be as high as other respondents, but it might also imply the scarcity of leisure time among younger people.

Our study revealed moderate demand for the quality of recreation environments on private lands. However, by focusing on demand, it provided only half of the picture. From the previous literature we know that there is quite a low willingness to produce ecosystem services in local trades between private parties (Grammatikopoulou 2013). To complete the picture of small-scale local agreements, it is essential to acquire information on landowners' attitudes towards voluntary work.

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Appendix 1

Table 11. Varimax-rotated factor analysis of respondents’ opinions concerning responsibilities and sharing of costs of landscape management on privately-owned land in Finland (n = 1426).

Variables	F1	F2	F 3	λ
<i>Landowner should take care of landscape management.</i>	0.043	0.625	0.021	0.084
<i>Landowner has the full right to manage and use the area as he or she decides.</i>	-0.035	0.037	0.355	0.041
<i>The costs for landscape management should be shared with those who use the area for outdoor recreation.</i>	0.700	-0.036	-0.114	0.361
<i>Landscape management for the area should be fully subsidized.</i>	0.434	-0.009	-0.271	0.190
<i>Dwellers in the region should be responsible for the majority of the costs of landscape management.</i>	0.510	0.217	0.036	0.238
<i>The costs of landscape management could be shared among the dwellers using the area for outdoor recreation in such a way that the landowner receives sufficient compensation.</i>	0.833	0.038	-0.029	0.425
<i>There is no need for landscape management in the area.</i>	-0.072	-0.378	0.444	0.096
Initial Eigenvalues	2.229	1.211	1.083	
Proportion of variance explained, %	31.84	17.30	15.47	
Explanation of factors:				
Factor 1: Positive towards landowner compensation				
Factor 2: Landowner is responsible for landscape management				
Factor 3: Landowner has the right to decide how the area is managed or there is no need for landscape management.				
Variable scale: 1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, and 5 = Strongly agree				