

Understanding the value of opportunities for tourist support in managing non-native invasive species

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Introduction

This paper examines the value of opportunities for tourist support for managing non-native invasive species while on their trip. Recently, an approach for involving the public, especially tourists, in the management of non-native species has attracted much attention. Many previous studies showed that it is important to effectively manage wildlife, especially non-native species, to get tourist support (García-Llorente et al., 2008). In Green Island, Taiwan, for example, the common sun skink (*Eutropis multifasciata*) has been managed through tourist support and the ratio of captured skunks has been decreasing (Chao and Lin, 2017). Although it is assumed that involving tourists in such conservation is effective for non-native species management, little research has been conducted focusing on the demand for opportunities of tourist support for invasive species management. We examined the eradication program for carp and the mangrove canoe tour as a case study.

In addition, this research contributes to the development of volunteer tourism. Tourists have been working voluntarily while travelling for short periods of time; such volunteer tourism has been growing rapidly across the world (Wearing 2001). Although the motivation and/or educational effects of volunteer tourism for wildlife conservation have been studied, few studies have focused on the demand for volunteer opportunities. Wearing and McGehee (2013) suggested that further researches should be conducted to identify most desired the form of volunteer tourism. That can show the unique potential of volunteer tourism. Thus, this paper contributes to developing the branch of volunteer tourism and our understanding on the value of voluntary conservation action, especially the conservation of ecosystems and environments.

Method

Research Site

We conducted our study at Amami Oshima Island in Japan that is located to the southwest of the Japanese archipelago and is the second largest island among the Nansei Islands of Japan (712km²). Because the island has rich and endemic ecosystems, a part of the island becomes a national park and a world natural heritage site candidate. The mangrove forests on the Amami Oshima Island especially have rich biodiversity and are visited by tourists and locals for recreation. However, in the mangrove forests and the river flowing through the forests, non-native species, such as koi carp, have contributed to biodiversity loss and ecosystem deterioration. Although the carp is considered a pest species and the managers and nonprofit

organization have tried to eliminate it, the managers recognize their lack of labor for undertaking this task. Thus, the managers expect support from the public, including tourists.

Questionnaire design

We used a choice experiment that has its origin in conjoint analysis and that has been employed in marketing, transportation, and other fields. Based on previous studies, current tours, and discussions with managers on the Amami Oshima Island, this study selected attributes and levels that are required to design the Profiles and choice sets: “availability of pick-up by guides (2 levels),” “time of tour (5 levels),” “the availability of options for carp capture (2 levels),” “fee for the tour (5 levels)”. To reduce the number of profiles handled and to avoid multicollinearity, we used D-efficient designs (Huber and Zwerina, 1996). We created choice sets that consist of “not attendance” and two profiles selected randomly; we then created six groups with five choice sets and provided each respondent with one of them selected randomly.

We divided the sample to distinguish the use value of carp captures: recreational value and non-use value: the value of voluntary management for non-native species. Thus, the information that “the option of carp capture contributes to non-native species management and conservation of ecosystems” was provided to only some respondents; the other respondents were not provided with this information.

Sampling procedure

We conducted a questionnaire survey among the tourists on the Amami Oshima Island during the summer vacation in August 2017 for data collection. Questionnaires were distributed to 924 tourists at the Amami Airport. A total of 341 questionnaires were returned via mail (with a response rate of 36.9%). For this analysis, we used the data of 319 respondents who answered all relevant choice experiment questions.

Statistical Analysis

Data obtained from the choice experiment were analyzed using a random utility model. In this study, we used a conditional logit model (McFadden, 1974) to assess the results of the choice experiment. In this model, it is assumed that the utility function is the sum of the deterministic term that can be described as a function of factors that influence respondents’ utility and the random term that is unobservable and stochastic for researchers. In addition, we calculated the marginal willingness to pay (WTP) value from the estimation results using the conditional logit model.

Results and Discussion

The estimation results obtained using the conditional logit model show that carp capture programs lower the utility regardless of whether they were provided with information (Table 1.). Although the marginal willingness-to-pay (MWTP) value of respondents, regardless of whether information was provided, had a negative value, the respondents who were provided with information could be involved in the management of non-native species without preventing the current tours because their MWTP value for adding the option of carp capture was only -42 JPY (about 0.42 USD).

Although the respondents did not prefer the carp capture option, they valued the voluntary management of non-native species. The cross term refers to the difference between respondents to whom information was provided and those to whom information was not provided, that is, the non-use value of the carp capture option.

These findings suggest that although the tourists value non-native species management, the option of carp capture is not accepted by tourists because it probably does not have

recreational value. Thus, managers should consider effective management of non-native invasive species by adding more recreational value to such tasks.

Table 1. Estimation results using the conditional logit model

Variable	Coefficient (Standard Deviation)	Marginal Willingness To Pay (JPY)
Trans	0.174 (0.0408) ***	440
Time (Based on 60 minutes as a reference)		
90 minutes	0.209 (0.0082) *	527
120 minutes	0.089 (0.0774)	224
150 minutes	-0.008 (0.0708)	-19
180 minutes	0.014 (0.0847)	36
Carp	-0.233 (0.0557) ***	-589
Carp*Explain	0.208 (0.0664) **	526
Fee*10 ⁻³	-0.395 (0.0026) ***	–
Non-attendance (alternative-specific constant)	-1.480 (0.1050) ***	-3731
Log-likelihood	-1467.9	

1) *Trans*: availability of pick-up by guides; *Time*: time of tour; *Carp*: the availability of options for carp capture; *Carp*Explain*: cross term of carp and presence the information provision; *Fee*: fee for tour;

2) ***p<0.001, **p<0.01, *p<0.05

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