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Tourist intentions to donate to non-lethal feral cat management at a potential natural World Heritage site in Japan

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ABSTRACT

Feral cat management needs cooperation, including financial support, from a variety of stakeholders. We used a payment card approach to investigate the willingness of tourists to donate to non-lethal feral cat management at a potential natural World Heritage site on Amami Oshima Island in Japan. We found that more than 80% of tourists intended to donate funds to non-lethal feral cat management, and the mean willingness to donate was about USD $14 (1374.1 JPY). The rate of participation in the donation was higher than that found in previous studies, and the amount of intention to donate was large enough to support non-lethal cat management. Respondent income and attitudes toward lethal options affected intentions to donate. Those who valued the island farmland also had a higher intention to donate. Our findings provide useful information for the implementation of feral cat management strategies to conserve biodiversity while minimizing conflict.

KEYWORDS

Amami Oshima Island; financial commitment; invasive alien species; non-lethal management; tourist support

Introduction

Cats (*Felis catus*) are charismatic companion animals that have been introduced to islands worldwide (Jarić et al., 2020). Some cats are feral, which means they are untamed and generally unsocialized to humans (Barrows, 2004; Levy & Crawford, 2004). Such feral cats have contributed to biodiversity losses on islands. In particular, cats can have serious impacts on native species in the enclosed spaces of islands where cats or other carnivorous mammals are not endemic predators (Medina et al., 2011; Nogales et al., 2004). More than 16 million animals are estimated to be killed by cats each year in New Zealand, where there are no native mammals except for bats (Medina et al., 2011). Studies also show that at least 248 species, including mammals (Mellink, 1992; Tershy et al., 2002), reptiles (Iverson, 1978; Mitchell et al., 2002), and birds (Jehl & Parkes, 1983; Veitch, 2001), have been affected by the negative impacts of feral cats on 120 islands around the world (Bonnaud et al., 2011; Medina et al., 2011). For these reasons, many countries have attempted to eradicate and/or manage feral cats (Bester et al., 2002; Nogales et al., 2004; Veitch, 2001).

Several types of feral cat management have been implemented on islands. Lethal options are the most common methods applied for successful eradication programs (Nogales et al.,

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2004) because they are considered more cost-effective than the in situ non-lethal option (Trap, Neuter, and Release [TNR]; Lohr et al., 2013). However, using lethal options for invasive species management often causes conservation conflicts, especially in residential areas (Japelj et al., 2019) because lethal options are not accepted by some citizens, particularly animal welfare stakeholders and cat owners (Lohr & Lepczyk, 2014; Mameno et al., 2017; Wald & Jacobson, 2013; Wald et al., 2013). In particular, Japanese feral cat management has serious conservation conflicts because the rate of acceptance of the lethal option tends to be low among Japanese people. For example, Mameno et al. (2017) showed that four-fifths of residents rejected the lethal option on Amami Oshima Island, where cat predation has caused a decline in native and rare species. The Ministry of the Environment (2020) reported that there was controversy about using lethal options for feral cat management on Amami Oshima Island. Conflicts can occur based on laws about animal welfare, and the application of lethal options for outdoor pet and stray cat management is banned by law in Japan (Morosaka, 2019). These conflicts are known as a major barrier to conducting effective management.

Therefore, non-lethal management of cats in residential areas often has to be implemented (Loyd & Miller, 2010b; Mameno et al., 2017; Mitsui et al., 2018). The adoption approach minimizes conservation conflicts and has also been implemented on some Japanese islands with high biodiversity richness such as the Ogasawara Islands, Teuri Island, and the Amami Islands (Haboro City, 2019; Ministry of the Environment, 2018; Mitsui et al., 2018). The adoption approach involves the live capture and adoption of feral cats, and this approach to feral cat management is the strategy most preferred by the public (Mameno et al., 2017). This approach has been applied to the Ogasawara Islands, which have been designated as a natural World Heritage site since 2003 (Mitsui et al., 2018). On these islands, more than 400 feral cats have already been adopted and new owners are required to care for the cats in an indoor environment (Nakayama, 2009). Thus far, the cats have mainly been adopted by urban residents of Tokyo Prefecture on the main island of Japan because the Ogasawara Islands are a part of Tokyo Prefecture. On the Ogasawara Islands and Teuri Island, adoption programs have effectively reduced the number of feral cats with the estimated population now under 10 on Chichi-Jima Island, which is one of the Ogasawara Islands (Tokyo Veterinary Medical Association, 2016), and the number has been reduced from 143 to closely zero on Teuri Island (Haboro City, 2019). As a result, the populations of endemic species, such as seabirds, have recovered on these islands (Kawakami, 2019).

The costs of using non-lethal options are often higher than the costs of using lethal options. On the Ogasawara Islands, expenses involved in implementing the adoption approach include labor, travel, and insurance costs, plus the cost of capturing and feeding the cats (Nakayama, 2009; Tokyo Prefecture, 2012). The cost of invasive species management accounts for approximately 70% of the natural World Heritage site management budget (Ogasawara Islands Natural World Heritage Office, 2014). On the Hawaiian Islands, achieving similar declines in the number of feral cats via non-lethal cat management would be approximately twice as expensive as lethal options (Lohr et al., 2013), which implies that a lack of financial resources may limit the implementation of non-lethal feral cat management. Thus, securing financial resources is one of the biggest challenges in the management of invasive species, including cats (Campbell et al., 2011; Gardener et al., 2010; Simberloff et al., 2005). On Amami Oshima Island in Japan, the current budget for feral cat

management from the Ministry of the Environment is approximately USD $460,000 per year (Ministry of the Environment, 2019).

A large proportion of funding for environmental conservation is derived from the public, and environmental conservation must therefore compete with other public-sector services such as education and health care (Anand, 2004; James et al., 1999). Consequently, the budget for conservation tends to be limited, especially if the value of biodiversity is underestimated. For example, because of deteriorating fiscal conditions, the public budget (about USD $780,000 in 2011) for the mongoose eradication program in Japan was recommended to be drastically reduced in the budget review alongside the change of the administration (Yamada et al., 2012). The recommendation included stopping fixed salaries for laborers and introducing reward money for each captured mongoose, though this approach has failed past in administrations (Yamada et al., 2012). Although the recommendation was rejected due to opposition by scientists and the public, it has still been a challenge to overcome financial resource shortages. Philanthropic measures, such as donations, have been considered an essential tool for success (Chao & Lin, 2017; Convention on Biological Diversity [CBD], 2014; Dunn et al., 2018; Gaertner et al., 2016; McNeely, 2001).

Despite the general agreement that budget shortages have prevented non-lethal feral cat management (Campbell et al., 2011; Ministry of the Environment, 2018), few studies have addressed the potential for monetary support from citizens for the management of cats. Most studies concerning feral cats and their management have assessed public attitudes toward feral cats and their management to illuminate any potential conflicts among stakeholders (Loyd & Miller, 2010a, 2010b; Mameno et al., 2017; Wald & Jacobson, 2013; Wald et al., 2013, 2014). A limited number of previous studies on other invasive mammals have estimated the willingness to pay (WTP) and social values associated with invasive mammal eradication (Mwebaze et al., 2010; Philip & Macmillan, 2003; Santo et al., 2015; Subroy et al., 2018). One of the most relevant studies to our study is Subroy et al. (2018) who revealed that the option of only relying on 1080 baiting is not preferred, and they concluded that a combination of management strategies should be implemented. The reason for their conclusion was mainly based on cost-effectiveness, but they also implied that there are possible effects of negative perceptions and preferences (Subroy et al., 2018). However, limited research has focused on the extent that the public is willing to provide monetary donations for management using options that minimize conservation conflicts (Mameno et al., 2017).

The purpose of our study was to assess the intentions of tourists to provide a monetary donation for feral cat management that uses the adoption approach. Tourists are one of the most important stakeholders on Amami Oshima Island in Japan because local communities, especially those around protected areas, depend on revenue from tourism. Moreover, previous studies have indicated that utilizing tourist support can overcome challenges associated with shortages of human and financial resources for invasive species management (Chao & Lin, 2017; Mameno et al., 2020). In fact, environmental managers request support from citizens who do not live on the island to overcome budget constraints and shortages of new cat owners. To the best of our knowledge, no studies have addressed voluntary financial commitments to non-lethal invasive species management strategies. We helped to address this knowledge gap here.

We also assessed factors affecting tourist intentions to donate funds. Previous studies concerning the WTP and intentions to support invasive species management (e.g., Bremner

& Park, 2007; García-Llorente et al., 2011; Mwebaze et al., 2010; Nishizawa et al., 2006) have found that socio-demographic factors, including age, sex, and income, affected support (Bremner & Park, 2007). For example, elderly and high income people have a higher WTP for invasive species management (García-Llorente et al., 2011). These studies also showed the effects of attitudes toward the environment, invasive species, and their management on WTP (Bremner & Park, 2007; Nishizawa et al., 2006). Nishizawa et al. (2006), for example, showed that people who think invasive species should be reduced tend to have a higher WTP. On the other hand, people who are familiar with the environment where invasive species live tend to have a lower WTP. By revealing the effects of respondent characteristics, our study can provide useful insights into public support for feral cat management. Our work also extends the literature regarding voluntary conservation approaches. A few studies have focused on such approaches (Chao & Lin, 2017; Mameno et al., 2020; Morzillo & Needham, 2015).

Methods

Study Site and Questionnaire Design

Amami Oshima Island is one of the Nansei Islands in southern Japan (28° 19′ N, 128° 22′ E; Figure 1). The island has subtropical broad-leaved forests and provides a habitat for various endemic and rare species. Given its rich biodiversity, part of the island is a protected area. These rich natural resources have also attracted a large number of visitors. In 2016, there were more than 300,000 visitors and the number continues to increase (Kagoshima Prefecture, 2020).

Although this island is expected to be designated as a natural World Heritage site because of its rich biodiversity (Amami Oshima City, 2015; Yamada & Sugimura, 2008), this designation has been prevented by the threat of invasive mammalian species, including feral cats (IUCN, 2018). Therefore, the Japanese government has managed feral cats using

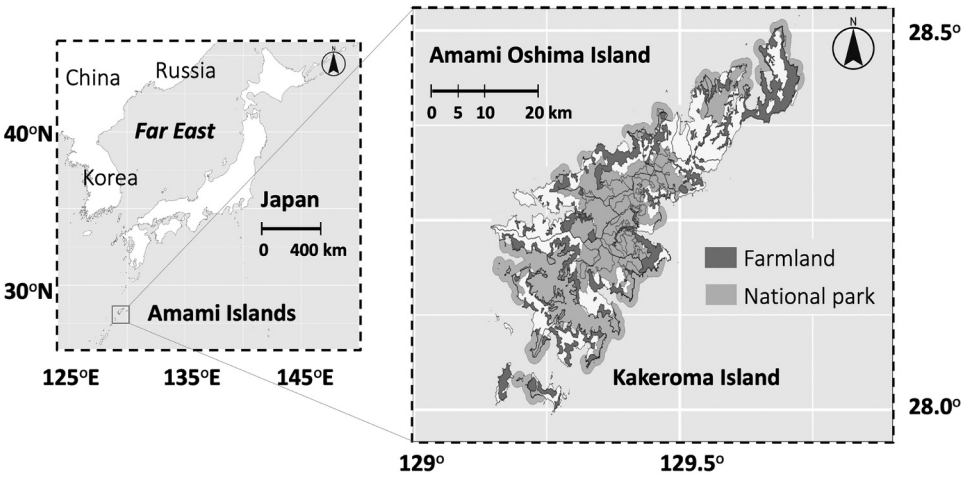


Figure 1. Map of the study site, Amami Oshima Island. * It is generally called Amami Oshima Island including Kakeroma Island because of the same administrative division. In our study, Kakeroma Island was also regarded as a part of Amami Oshima Island

an adoption approach that minimizes conservation conflicts (Ministry of the Environment, 2018). However, the program on this island has several challenges. The estimated number of feral cats (600–1200) is more than those of other Japanese islands where non-lethal management was previously implemented. In addition, a large number of stray cats that live in towns and rural areas can access rare species and habitats (Ministry of the Environment, 2016). Therefore, feral cat management on Amami Oshima Island requires more financial resources than does management on other islands in Japan.

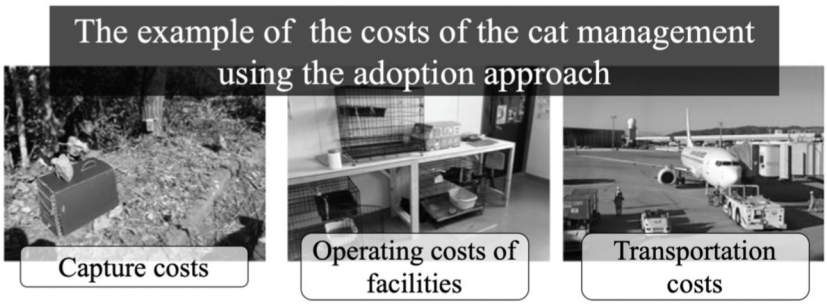
We conducted a questionnaire that mainly included questions concerning four issues. First, respondents were asked about their attitudes toward reducing feral cat populations, regardless of the management method. Second, respondents were asked about their attitude toward management options (adoption and lethal options). Third, they were asked about their willingness to donate to feral cat management that applied adoption as a non-lethal option. Finally, questions asked about individual characteristics. Regarding the former two aspects, respondents were asked their attitudes using 5-point scales.

To assess WTP, we applied the contingent valuation method (CVM) using a payment card-type questionnaire. (Martín-López et al., 2007; Mwebaze et al., 2010; Nishizawa et al., 2006). The CVM was originally a tool for determining the value of environmental goods. In the CVM, respondents were presented with a scenario that included a hypothetical improvement of an environment and asked the maximum amount of money they would be willing to pay to achieve this scenario (Loomis & duVair, 1993; Walsh et al., 1984). The concept of the CVM was created by Ciriacy-Wantrup (1947) and the first empirical study was conducted by Davis (1963). Our payment card-type questionnaire listed a range of JPY amounts (JPY at 100 is converted to a dollar [USD]), including zero, from which a respondent selected their willingness to donate (Figure 2). Each respondent was asked to answer the payment-type questionnaire only once.

Although the dichotomous choice option in CVM studies seems to be the most popular approach and is also the one recommended by the National Oceanic and Atmospheric Administration (NOAA) panel (Arrow et al., 1993), some studies have indicated that the payment card approach is superior in terms of estimating conservative WTP amounts compared to the dichotomous choice option in any situation (Blaine et al., 2005; Loomis et al., 2018; Ryan et al., 2004). Specifically, when the sample size is relatively small, the payment card approach is more appropriate (Hanemann et al., 1991).

Data Collection and Analysis

We randomly distributed questionnaires to Japanese visitors at Amami Airport on Amami Oshima Island from August 12 to 15, 2016. The reason we only targeted Japanese visitors was the limited number of foreign tourists. A total of 1,000 questionnaires were distributed. Of these, 340 questionnaires were returned by mail (34% response rate). For our analysis, we used the data from the 317 respondents who answered all relevant questions (23 respondents were excluded because we could not retrieve data about their intention to donate and other data). The socio-demographics of respondents are summarized in Table 1. Approximately half of respondents were male (n=153). The most represented age group was between 40 and 49 years of age (n=103), followed by 30 to 39 years of age (n = 77). The number of respondents who had not visited the island before was 186 (59%).



If you are asked to support cat management using an adoption approach, how much will you contribute to such management? Please select the value closest to the amount you can donate and circle it.

! Please note that donated funds will reduce the amount of your money available for other uses.

⓪0 JPY（Non-donation） ①100 JPY ②200 JPY ③300 JPY ④400 JPY ⑤500 JPY
⑥600 JPY ⑦700 JPY ⑧800 JPY ⑨900 JPY ⑩1000 JPY ⑪1500 JPY
⑫2000 JPY ⑬Over 3000 JPY （ JPY）

Figure 2. Sample of the payment card-type question presented actually to respondents. As shown in the figure, there are some costs associated with the implementation of the adoption approach, such as "Cat capture costs", "Operating costs of facilities housing cats until new owners are found", and "Transportation costs for the transfer to new owners".

Table 1. Sociodemographic characteristics of the respondents.

Characteristics	
Sex	Male: 153 (48%), Female: 164 (52%)
Age	10–19: 8 (3%), 20–29: 55 (17%), 30–39: 77 (24%), 40–49: 103 (33%), 50–59: 60 (19%), 60–69: 11 (3%), over 70: 3 (1%)
Times visiting the island	1st time: 186 (59%), 2nd time: 30 (9%), 3rd time: 16 (5%), 4th time: 7 (2%), 5th time: 15 (5%), 6th time and more: 62 (20%), unknown: 1

To estimate tourist intentions to donate to non-lethal feral cat management, the median and mean of the willingness to donate were calculated. To identify the characteristics of respondents who were more or less willing to donate, the function of intent to donate was estimated with a Tobit regression model and nine explanatory variables (Bremner & Park, 2007; García-Llorente et al., 2011; Mwebaze et al., 2010; Nishizawa et al., 2006). We assumed that the choice of 0 JPY was a legitimate choice based on a lack of intention to donate (Wooldridge, 2002). Table 2 shows the details of variables used in our analysis. Results of the Tobit regression model were estimated by the VGAM package in R (Yee, 2020; R Core Team, 2019).

Results

More than half of respondents agreed that the number of outdoor cats should be decreased, and a few (14%) agreed with the use of lethal cat management. In contrast, 62% of

Table 2. Description of the variables used in the Tobit model.

Variables		Mean	*SD*
WTP (Response variable)	Respondents' willingness to pay for non-lethal cat management in Amami Oshima Island	1187	2459
Env-Forest	Dummy variable indicating whether the respondents considered forests to be an important area on Amami Oshima Island: Yes is 1, No is 0	0.7855	0.4111
Env-Farmland	Dummy variable indicating whether the respondents considered farmland to be an important area on Amami Oshima Island: Yes is 1, No is 0	.3028	0.4602
Rare species viewing	Willingness to view the rare species on Amami Oshima Island, such as Amami rabbits: "Not interested (=1)" to "Interested (=5)"	3.659	1.033
Cat viewing	Dummy variable representing whether the respondents have seen outdoor cats during their visit to Amami Oshima Island: Yes is 1, No is 0	0.3281	0.4703
Atti-Adoption	Attitude toward feral cat management by the adoption approach on Amami Oshima Island: "Undesirable (=1)" to "Desirable (=5)"	3.751	1.127
Atti-Lethal	Attitude toward feral cat management by the lethal option on Amami Oshima Island: "Undesirable (=1)" to "Desirable (=5)"	2.170	1.218
Male	Dummy variable representing the respondents' gender: Male is 1, Female is 0.	0.5174	0.5004
Age	Variable indicating the respondents' age: from 10 (=1) to over 70 (=7)	3.621	1.199
Income	Variable indicating annual household income: under 2 million JPY (=1) to over 18 million JPY (=10)	4.530	2.711

* In this table, the JPY at 100 is converted to a dollar (USD).

respondents agreed with management using the adoption approach (Atti-Adoption). Furthermore, 87% of respondents showed a willingness to donate to feral cat management, and their mean willingness to donate was 1187.7 JPY (≒USD $11.87; median=500.00 JPY, S.D.=2459.6). In addition, the mean willingness to donate calculated excluding rejected answers (i.e., 0 JPY) was 1374.1 JPY (≒USD $13.74). The median willingness to donate was 1000 JPY (≒USD $10.00; S.D.=2597.2).

The estimated results of the Tobit model are presented in Table 3. The coefficients of five variables were statistically significant at the 5% level. The coefficient of the variable referring to the attitude toward lethal cat management (Atti-Lethal) was negative (Coefficient= −341.17, S.E.=134.79), and the coefficients of the dummy variable indicating whether respondents considered forests to be important areas (Env-Forest; Coefficient=1362.6, S.E.=337.61), respondent willingness to view rare species (Rare species viewing; Coefficient=380.90, S.E.=150.85), the dummy variable representing whether respondents had seen outdoor cats during their visit (Cat viewing; Coefficient=662.37, S.E.=325.36), and

Table 3. Estimation results from the Tobit model.

Variables	Coefficient	Std. Error	P>|z|
Env-Forest	−225.97	390.67	0.5630
Env-Farmland	1362.6	337.61	0.0000
Rare species viewing	380.90	150.85	0.0116
Cat viewing	662.37	325.36	0.0418
Atti-Adoption	175.62	140.55	0.2115
Atti-Lethal	−341.17	134.79	0.0114
Male	211.69	312.37	0.4980
Age	115.42	136.31	0.3971
Income	197.49	58.927	0.0008
(Intercept 1)	−2493.1	1063.9	0.0191
(Intercept 2)	7.8141	0.0537	0.0000
Number of Fisher scoring iterations	18		
Log likelihood	−2560.749		

* See Table 2 for the details of variable names

income (Income; Coefficient=197.49, S.E.=58.927) were positive. The coefficients of other variables in the model were not significant.

Discussion

Feral cats are recognized as a threat to biodiversity on islands (Bonnaud et al., 2011; Medina et al., 2011). Given that a lack of financial resources is usually one of the barriers to effective feral cat management efforts (Campbell et al., 2011), people's intentions to donate to management efforts should be determined to facilitate successful implementation. Most previous studies regarding invasive mammal management have assumed the use of lethal options as one scenario (e.g., Mwebaze et al., 2010; Roberts et al., 2018; Santo et al., 2015). However, in some countries, especially Japan, the US, and the UK, non-lethal options are often preferred for invasive mammals, particularly companion animals such as feral cats and dogs (Loyd & Miller, 2010a, 2010b; Mameno et al., 2017; Wald & Jacobson, 2013).

To compare our results to previous relative studies (e.g., Mwebaze et al., 2010; Nunes & Van Den Bergh, 2004; Subroy et al., 2018), the following discussion is based on the WTP results and excludes respondents who answered 0 JPY. As a result, 87% of respondents had an intention to donate and the mean of their willingness to donate was 1374.1JPY (≒USD $13.74). Considering that more than 300,000 tourists visited Amami Oshima Island in 2016 (Kagoshima Prefecture, 2020), our results suggest that more than 260,000 people may be willing to donate funds to feral cat management that uses the adoption approach, and approximately 358 million JPY (about USD $3.58 million) could be collected from their monetary donations. Moreover, the number of visitors will continue to increase in the future, although the recent COVID-19 pandemic might significantly change the tourism industry. Based on the current management costs of about USD $460,000, our research suggests that monetary donations by tourists may be sufficient to support the non-lethal feral cat management program. Utilizing tourist financial support may have a significant positive effect on feral cat management. We demonstrate the feasibility of financial commitment from tourists for invasive species management in addition to the context of lethal management (Chao & Lin, 2017; Malpica-Cruz et al., 2017; Mameno et al., 2020). Our results also show that the rate of respondents who were willing to donate was about twice as high as those found in previous studies (Mwebaze et al., 2010; Nunes & Van Den Bergh, 2004), but the mean amount of money they were willing to donate was about half as high (Mwebaze et al., 2010; Subroy et al., 2018). The different results could be derived from differences in the status of conservation target species and control strategies (Subroy et al., 2018).

Our study also investigated factors affecting the intention to donate to feral cat management using a non-lethal option. Our results showed that attitudes toward lethal options are a significant predictor of the intent to donate. This is consistent with theories suggesting that attitudes predict behavioral intentions (Ajzen & Fishbein, 1980). This finding indicates that the method used for managing feral cats is a key factor in obtaining people's financial commitment, which is similar to the results of Subroy et al. (2018). Our results also show that respondents with relatively high incomes had a higher intention to donate than did those with lower incomes, which is consistent with results of a previous study involving the CVM (McIntosh et al., 2010). One interesting finding is that respondents who consider farmland (Env-Farmland), rather than forest, as a critical environment on Amami Oshima

Island had a higher intention to donate. These results support a previous study that uncovered the effects of knowledge and attitudes toward WTP for invasive species management (García-Llorente et al., 2011). There is the unique belief among Japanese people about cats and their impacts on wildlife. A previous study indicated that Japanese people tend to believe that cats have fewer impacts on wildlife compared with what residents of other countries believe (i.e., UK, USA, Australia, New Zealand, China; Hall et al., 2016). The results might also be related to knowledge gaps regarding the impacts of cats living in farmlands, including the occurrence of infections transmitted by cats, such as toxoplasmosis (Glen et al., 2019; Nutter et al., 2004; Tenter, 2009).

Our results also suggest there may be a paradoxical problem in tourist support for feral cat management, as the experience of outdoor cat viewing in Amami Oshima Island is a key predictor of the willingness to donate. The frequency of encounters with outdoor cats in/around farmland can affect the results. This finding implies that tourists could have a lower intention to donate to feral cat management when the number of cats decreases due to feral cat management. Thus, more aggressive feral cat management may lead to lower monetary support from tourists. Future research should directly assess tradeoffs in tourist desire to watch outdoor cats versus their desire to see rare species.

Managers should also provide information to visitors about the contributions of other participants and/or the initial amount of government funding (i.e., seed money) to programs. Experimental evidence shows that this information can increase tourist WTP for environmental programs (Kubo et al., 2018).

Tourism, especially nature-based tourism, often places a burden on environmental resources that are important for local economies around protected areas (Geffroy et al., 2015). Amami Oshima Island is expected to be designated as a natural World Heritage site in the near future. Such designations lead to increased tourist numbers, and the associated increase in tourist impacts may deteriorate the natural resources (Larson et al., 2016; Rogala et al., 2011). However, respondents who were willing to view rare species tended to report a high willingness to donate and such donations contribute to the implementation of effective feral cat management strategies. Considering that management increases the population of rare species and the chance of watching rare species, utilizing tourist financial support can also increase the local benefits from wildlife viewing tours (Kubo et al., 2019).

Our findings provide useful information for feral cat management on Amami Oshima Island. It is urgent to manage feral cats on this island to conserve endangered species and secure the island's designation as a natural World Heritage site (e.g., Ministry of the Environment, 2019). However, according to Mameno et al. (2017), lethal cat management was not accepted by residents. This criticism leads to conservation conflicts among stakeholders, which is one of the drivers delaying the implementation of conservation strategies. Our study shows that tourist donations have the potential to enhance feral cat management implementation while helping to minimize conservation conflicts (Loyd & Miller, 2010a, 2010b; Mameno et al., 2017; Wald & Jacobson, 2013). Moreover, our findings may be applied to other residential islands. For example, using the option of capturing and adopting may help to avoid conflicts among some stakeholders in Hawaii. Despite Hawaii having one of the highest acceptance rates for using lethal options, at least one group (animal welfare organizations) disapproves the use of lethal options, which could lead to conflicts (Lohr & Lepczyk, 2014). In New Zealand, although the public accepts the lethal option for feral cats, their support for the lethal option for stray cats is lower (Glen & Hoshino, 2020).

Considering that the adoption approach can receive broader social acceptance compared to lethal control or TNR (Loyd & Hernandez, 2012; Glen & Hoshino, 2020), involving tourists and obtaining their financial support for feral cat management enables implementation of management strategies without any conflicts preventing the application of more effective management efforts on islands.

Although our study makes several contributions to invasive mammal management, there are some limitations to applying our results to actual policymaking. The valuation method with stated preferences has been the subject of criticism due to potential biases (Martín-López et al., 2007; Murphy et al., 2005) and previous valuation studies revealed that the actual behaviors (i.e., actual monetary donations) were sometimes different from the intention to donate and/or the WTP, which is considered to be a hypothetical bias (Hanley & Czajkowski, 2019; Harrison & Rutström, 2008). Harrison and Rutström (2008) reviewed 39 stated-preference method papers and found that the mean bias was approximately 300%. Moreover, the higher the stated value of the goods, the bigger the bias (Murphy et al., 2005). Other studies to address bias have indicated that the value of goods estimated by the stated preference methods is lower than the value estimated by revealed preference methods and actual donating behaviors (Brander & Koetse, 2011; Macmillan et al., 1999). Although there is also evidence that 80% of respondents provide consistent values in actual behavior (Champ & Bishop, 2001), hypothetical bias increases the reluctance among policymakers to apply results of stated preference when implementing policies. To solve this problem, field experiments related to nature conservation have recently received much attention (e.g., Kubo et al., 2018) because field experiments enable researchers to examine real-world contexts (Harrison & List, 2004). Therefore, findings from field experiments are critical and provide comprehensive information to policymakers. Further studies are needed to investigate actual behaviors related to donations in real-world contexts.

To date, invasive mammal management has faced financial shortages, even in protected areas (Campbell & Donlan, 2005; Campbell et al., 2011; Howald et al., 2007). Our findings show that obtaining monetary donations from tourists may enable the implementation of feral cat management by enhancing the local economy on Amami Oshima Island. Although there are some limitations, our study provides useful insights into possible effective management of invasive mammals that are also companion animals, such as feral cats, on islands.

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Declaration of Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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