Visitor Perceptions of the Inscription on the World Heritage List: The Use of Stated Choice Methods

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Abstract: This study examines how visitors to Daisetsuzan National Park in Japan perceive its inscription on the World Heritage List by applying stated choice methods. Most visitors regarded the inscription as favourable although their willingness to pay indicated that better visitor control and further conservation of natural resources would be necessary by taking opportunity of the inscription. However, the current situation of World Heritage sites in Japan indicates that the domestic management system of natural resources is inadequate to realize these visitor visions. We conclude that the nomination of Daisetsuzan National Park for the World Heritage List should be reconsidered, but only after the Japanese management system for natural resources has been improved.

Introduction

The World Heritage mission is to encourage the identification, protection, and preservation of cultural and natural heritage around the world, which is considered to be of outstanding value to humanity. The mission is embodied in an international treaty called the Protection of the World Cultural and Natural Heritage, adopted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1972 (UNESCO 2000).

As of November 2003, 177 states had signed the treaty, and 754 properties had been added to the World Heritage List. One hundred and forty-nine properties of 754 are natural or natural/cultural mixed properties (UNESCO 2000). These World Natural Heritages globally have remarkable value from aesthetic, ecological and scientific perspectives, furthermore, it also plays an important role in the management of domestic natural resources. In Japan, Yakushima and Shirakami-Sanchi were inscribed on the World Heritage List in December 1993.

This study examines how visitors to Daisetsuzan National Park perceive its inscription on the World Heritage List. Daisetsuzan National Park has been a candidate for World Heritage site in Japan; some local communities and NPOs have been in favour of its inscription. From the standpoint of the current situation of other World Heritage sites in Japan, we also discuss whether the inscription of Daisetsuzan National Park on the World Heritage List will contribute to the realization of visitor visitons of what Daisetsuzan National Park ought to be.

The Status of Yakushima, Japan, a World Heritage Site

First, we discuss the current situation of the Yakushima in Japan, a World Heritage site and examine issues concerning the Japanese management system of natural resources (e.g. national park system), which is in charge of managing World Heritage sites in Japan.

Yakushima is a circular and conical island that is almost 130 km in circumference (Figure 1).

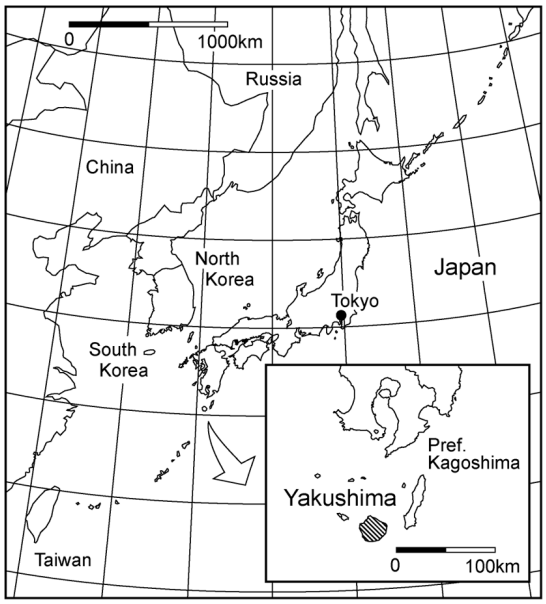

Figure 1. Yakushima in Japan.

Mt. Miyanoura-dake (1,936 m), the highest mountain in southern Japan, and some 40 other peaks over 1,000 m constitute the center of the island (Kagoshima Prefecture 2004). Yakushima has been on the World Heritage List since 1993. It has a diverse ecosystem with many endemic or endangered plants and animals, including Yaku Cedars, which can be thousands of years old, and a continuum of climate from sub-tropical on the coastlines to sub-alpine in the mountain peaks. Yakushima has also been designated as a national park; it was included as a part of Kirishima-Yaku National Park in 1964.

Inscription on the World Heritage List provides both protection of the ecosystem and landscape in Yakushima as well as economic benefits. However, the growing number of visitors resulting from the fame of the location has brought about various problems. For example, congestion has resulted in visitors' bivouacs around some mountain huts (camping is only permitted in designated areas). There are an insufficient number of toilets to serve the visitors at the huts; as a result, visitor's toilet demand have exceeded the capacity of available facilities and temporary pit toilets have been constructed around the huts. These have invited intensive crowding for visitors and damages on ecosystem.

These huts are located not only in the heritage site but also in Special Protection Zone: core areas of national park under Ministry of the Environment, Forest Biosphere Reserve under Forest Agency and Special Natural Monument under Agency for Cultural Affairs. Nevertheless, there are no controls on number of visitors because of complicated land ownerships and sectionalism of ministries and government offices (see Ito 1996 for details). This situation is not exclusive to Yakushima but, on the contrary, common to every nature conservation area, including national parks, in Japan. After all no practical measures against overuse (e.g. use limits, first-come first-served, reservation and lottery) have been taken in management system of natural resources.

These overuse situations cannot be improved under rules of the treaty as the management system of concerned countries will be largely adopted for management of heritage sites. Therefore, these current issues pose a question: whether the nomination and potential inscription of Daisetsuzan National Park on a World Heritage List will lead to the realization of visitors visions of what Daisetsuzan National Park ought to be.

Study Area

Daisetsuzan National Park (Figure 2) is the largest terrestrial park in Japan, with vast wilderness. This study is focused on the northern part of Daisetsuzan National Park, the Omote Daisetsu area, which includes Mt. Asahi-dake (2,290 m), the highest peak on Hokkaido Island. In this area, large snow patches last into midsummer, and alpine plant communities are widely distributed. Coniferous forests are widely

Figure 2. Daisetsuzan National Park in Japan.

distributed on the mountainside, and they offer habitats for various species of wildlife, including brown bears. In addition, trails have been established to offer recreation opportunities to visitors. Some trails have easy access, whose trailheads start from terminals of the ropeways at Asahidake Spa or Sounkyo Spa whereas others are located in remote and primitive areas around Mt. Tomuraushi-yama in a southern part of the Omote Daisetsu area. Every year, people visit the Omote Daisetsu area to experience its natural environment. Records show that, in the summer of 2000, about 50,000 people visited the area.

However, the popularity of the area as a trekking destination has resulted in congestion at mountain huts and designated camping areas, crowding on trails and peaks, tramping damages to alpine plants, and disturbing wildlife habitats (Aikoh et al. 1992, Park and Asakawa 1993, Aikoh et al. 1995, Kobayashi 1995).

Method

Choice Experiment

Choice Experiment (CE) has its origin in conjoint analysis, which has been employed in marketing, transportation, and other fields (Hensher 1994, Louviere 1994). Conjoint analysis is a method used to represent individual judgements of multi-attribute stimuli (Batsell & Louviere 1991). CE differs from typical conjoint analysis in that individuals are asked to choose from choice sets (alternative bundles described in attributes) instead of ranking or rating ('alternative' is also termed as 'profile' in terminology). Once one understands how changes in the attributes affect satisfaction levels by CE analysis, one can predict how possible alternatives will impact satisfaction (Louviere & Timmermans 1990).

Since the late 1990s, the method has been frequently used in environmental valuation (Mackenzie 1993, Adamowicz et al. 1994, Boxall et al. 1996, Adamowicz et al. 1998, Hanley et al. 1998). For application to the valuation of recreational management, Schroeder and Louviere (1999) used the method to valuate campsite facilities, and Lawson and Manning (2002) used it to formulate indicators and standards of quality for wilderness experiences.

Selection of Scenario, Attributes, and Levels

First, we identified a decision problem to formulate a questionnaire scenario. We hypothesized requiring a one-time payment from visitors into a fund that would be established to promote the site's inscription into the World Heritage List. Once the inscription had been obtained, the fund would be used to realize the visitors visions for the park. We anticipated that quite a few respondents were aware of the problem of Yakushima and, hence, would refuse to pay for the World Heritage Fund by the UNESCO. Therefore, we intentionally explained the issues of overuse at Yakushima in the questionnaire and designed a scenario so that respondents could participate in determining how the fund would eventually be used. Respondents were requested to choose a preferable alternative constituted of attributes in CE task.

Four attributes and levels considered highly important to all visitors were chosen: the establishment of roads and trails, the number of visitors, the conservation of brown bear's habitats, and the conservation of alpine plants (Table 1). A nominal scale was used to set the attributes. A coding method, called "effect code," was used to estimate the coefficients of the attributes (see Louviere 1988, Holmes & Adamowicz 2003, for details).

Design of Choice Set

Profiles and choice sets can be designed once attributes and levels are set. In this case, $5^3 \times 2^2$ combinations of profiles can be assumed, since there are three attributes with five levels and two attributes with two levels. To reduce the number of profiles for handling and avoid multicollinearity, we used orthogonal main effect design, in which profiles are designed to maintain the orthogonality of each attribute (see Louviere et al. 2000, Holmes & Adamowicz 2003, for details). Orthogonal main effect design created 25 profiles.

We created choice sets that consist of the *status quo* profile: all attributes set *current situation* in Table 1, and three profiles selected randomly from the 25 profiles. Eight groups with seven choice sets were created, and each respondent was provided with one of them selected randomly. One of the choice sets that was presented to the respondents is shown in Figure 3.

Table 1. Attributes and their levels used in Choice Experiment.

Attributes and Levels
Establishment of roads[a] and trails
· Trails should be developed for easier trekking throughout the Omote Daisetsu, and roadways and car parks should be built.
· Although trails should be developed for easier trekking throughout the Omote Daisetsu, roadways and car parks should be maintained at the current level.
· Keep current level of roads and trails (*current situation*).
· Trails should be maintained at the current level, and roadways and car parks should be reduced in the areas where environmental conservation is important.
· Trails, roadways, and car parks should be reduced in the areas where environmental conservation is important.
Number of visitors
· Active efforts should be made to attract more visitors.
· No action (*current situation*).
· Number of visitors should be maintained at the year 2000 level.
· Number of visitors should be reduced to 80% of the year 2000 level.
· Number of visitors should be reduced to half of the year 2000 level.
Conservation of brown bears' habitats
· Trails are occasionally closed due to the high possibility of encountering a bear/bears (*current situation*).
· The Kogen Spa area should be closed through the season for conserving the habitat of the bears.
Conservation of alpine plants
· Building fences to keep visitors off alpine plans (*current situation*).
· Boardwalks should be built accordingly to prevent further destruction of alpine plants in the Omote Daisetsu area.
Fund[b]
· 1,000 yen, 3,000 yen, 5,000 yen, 10,000 yen, 15,000 yen

[a] Roads are primarily used to refer to access roads.
[b] A hundred yen was about 0.9 US dollar or 0.7 euro in February, 2004.

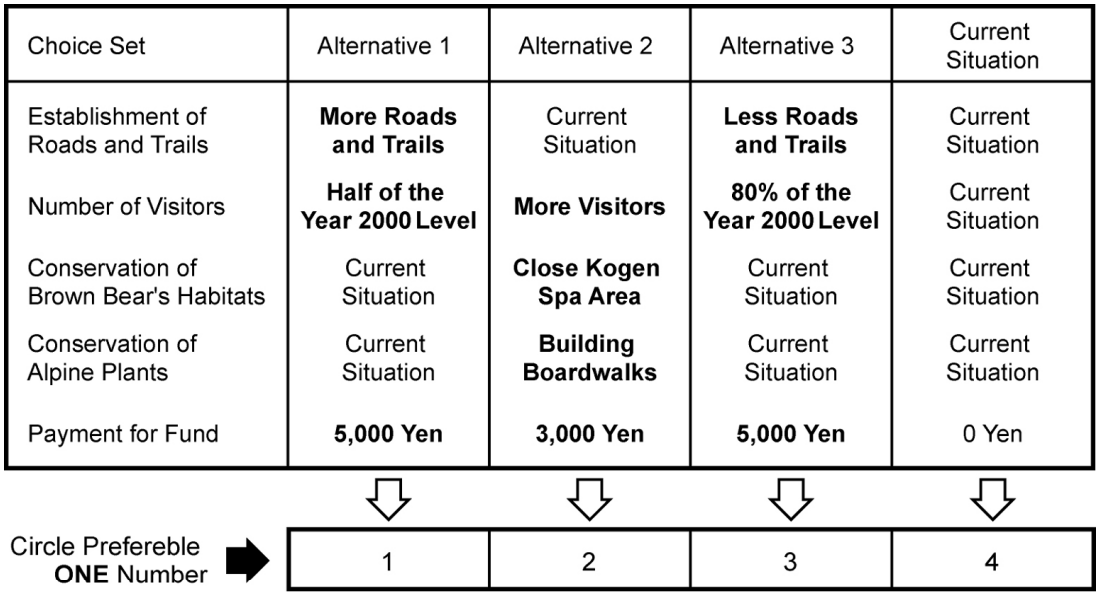

Figure 3. A example of choice set presented to respondents.

An on-site return-mail survey was conducted at each trailhead and on trails in the Omote Daisetsu area in August 2000. In total 1,872 questionnaires were distributed, and 814 (43.5%) were returned. After removing respondents who always chose the *status quo* profile in the CE task, we were left with 520 completed respondents.

Estimation Procedures

The random utility model quantifies responses for CE task. Each profile *i* in the choice set is represented with a utility function that is composed by a deterministic component. The unobservable, overall utility *U* of profile *i* is represented by:

$$U_i = V_i + \varepsilon_i$$

V_i is the deterministic component, and ε_i is random error component. The probability that an individual will choose profile *i* over other profiles *j* is given by:

$$\Pr(i \mid C) = \Pr\left[U_i > U_j\right]$$
$$= \Pr\left[V_i - V_j \geq \varepsilon_j - \varepsilon_i\right]; \forall j \in C$$

where *C* is the choice set of all possible profiles. With no loss of generality, the deterministic component can be expressed as linear-in-parameters, such as:

$$V_i = \boldsymbol{\beta}' \boldsymbol{x}_i$$

where $\boldsymbol{x}_i$ is a vector of observable attributes, and $\boldsymbol{\beta}$ is a vector of utility coefficients to be estimated. Assuming that type I extreme value distribution (Gumbel distribution) for the error term, the probability of choosing profile *i* produce conditional logit model (McFadden 1974):

$$\Pr(i \mid C) = \frac{\exp(\mu \boldsymbol{\beta}' \boldsymbol{x}_i)}{\sum_{j \in C} \exp(\mu \boldsymbol{\beta}' \boldsymbol{x}_j)}$$

where μ is the scale parameter, which is typically asumued to equal 1 in any single sample (Ben-Akiva and Lerman 1985). The vector of utility coefficients can be estimated by the maximum likelihood method (Greene 2000).

Result

Descriptive Statistic for the Sample

Almost all of the respondents (94.6%) had knowledge of the World Heritage mission, and 700 respondents (86.0%) agreed with or would possibly agree with payment for a hypothetical fund, if the proposed payment to the fund was reasonable for them. Ninety-nine respondents (12.2%) refused to pay for the hypothetical fund. Sixty (7.4%) of 99 respondents rejected the idea because they believed that Daisetsuzan National Park should not be added to the World Heritage List.

Choice Experiment

Table 2 shows the results of conditional logit model. All coefficients were estimated based on the *current situation*. The three alternative-specific constants (ASCs) correspond to constant terms for each deterministic component for profile *i*.

Log-likelihood ($\boldsymbol{\beta}$=0) is the log-likelihood in which all coefficients are 0, and log-likelihood (Max) is the log-likelihood in which coefficients are the results shown in Table 2. Rho-bar-square is the

Table 2. Coefficients in the choice experiment and willingess to pay.

Attributes and Levels	Coef.	(S.E.)	WTP[d]
Establishment of roads[a] and trails			
More roads and trails	-0.49	(0.07)**	-3,493
More trails	-0.04	(0.06)	-304
Keep current level[b]	0.32	(0.12)**	2,258
Less roads	0.12	(0.06)*	858
Less roads and trails	0.10	(0.05)	681
Number of visitors[a]			
More visitors	-0.98	(0.07)**	-6,927
No Action[b]	0.24	(0.12)**	1,698
The year 2000 level	0.53	(0.05)**	3,732
80% of the level in 2000	0.41	(0.05)**	2,906
50% of the level in 2000	-0.20	(0.06)**	-1,409
Conservation of brown bears[a]			
Close trails occasionally[b]	-0.10	(0.03)**	-715
Close Kogen Spa Area	0.10	(0.03)**	715
Conservation of alpine plants[a]			
Building fences[b]	-0.36	(0.03)**	-2,546
Building boardwalks	0.36	(0.03)**	2,546
Fund$\cdot 10^{-3}$ [c]	-0.14	(0.01)**	
ASC_1	0.69	(0.12)**	
ASC_2	0.77	(0.11)**	
ASC_3	0.69	(0.12)**	
Number of Choice Sets		3031	
Log-likelihood (Max)		-3607.3	
Log-likelihood (β=0)		-4185.9	
$\bar{\rho}^2$		0.14	

[a] Effect coded variable. [b] Current situation.
[c] Ratio scaled variable. [d] Japanese yen.
* $p < .05$. ** $p < .01$.

adjusted log-likelihood ratio index, which is an indicator of the goodness of fit of the model (Ben-Akiva & Lerman 1985).

Based on the estimations of how changes in the attributes or levels affect utility levels through the same functional form, we calculated willingness to pay (WTP) for each attribute and level (Table 2). For example, the effect on 'building boardwalk for the conservation of alpine plants' is 0.36 for utility levels; the effect on 'payment 1 yen for the fund' is $-0.14 \cdot 10^{-3}$ for utility levels. Therefore, the effect of coefficient building boardwalk in a monetary unit can be calculated through dividing the boardwalk coefficient by the fund coefficient $-(0.36/-0.14*10^{-3})$.

Discussion

Most visitors regarded the inscription of Daisetsuzan National Park on the World Heritage List as favourable, since they knew the World Heritage mission well, and more or less agreed with payment for a hypothetical fund that would forward the inscription.

Our results of CE showed that visitor visions of the inscription of Daisetsuzan National Park in Japan on the World Heritage List, helping us to find out what kind of action plans could realize their favourable management. They generally indicated a desire for visitor control and further conservation of natural resources. This tendency is supported by the highest WTP: 3,732 yen for 'Number of visitors should be maintained at the year 2000 level'; the lowest WTP: -6,927 yen for 'Active efforts should be made to attract more visitors'; and a quite high WTP: 2,546 yen for 'Boardwalks should be built to prevent further damage to alpine plants in the Omote Daisetsu area'. The WTP: 695 yen (2,258+1,698–715–2,546=695) for the *status quo* profile did not indicate that visitors regarded current management as a negative alternative. Compared with the WTP: 9,251 yen (2,258+3,732+715+2,546=9,251) for the most desirable profile, however, choosing current management appeared to be far less preferable.

In view of the current issues of heritage sites and conventional management system of natural resources in Japan, it is difficult to foresee the implementations of strong controls for crowding and damage on the ecosystem. Therefore, it may not be realistic to choose the most desirable or preferable combination of attributes with high WTP, although it is possible to choose the *status quo* alternative. These findings demonstrated the inscription is unlikely to lead to realize visitor visions of what Daisetsuzan National Park ought to be.

We conclude that the nomination of Daisetsuzan National Park for the World Heritage List should be reconsidered, but only after the Japanese management system for natural resources has been improved. Further discussion on how Japanese management system for natural resources ought to be is of a first priority.

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