

# 44 Evaluation of crowding acceptability in national recreation area using field and web-based surveys: A case study in Shiretoko World Heritage site

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## Introduction

Crowding management is an important issue in the field of natural recreation. Our study site at Shiretoko National Park is one of Japan’s most popular natural recreation areas, visited by over 1 million visitors every year. Particularly in the summer season, many visitors want to observe bears, causing crowding problems. To solve these crowding issues, it is essential to determine the appropriate carrying capacity in natural recreation areas. To this end, investigating visitors’ crowding perceptions (crowding norms) is necessary.

There are various approaches to measuring visitors’ crowding norms. More recently, visual approaches have been widely applied. This approach enables the identification of respondents’ crowding norms by asking them to identify the most acceptable level of crowding using photographs or illustrations (Manning & Freimund, 2004). As this approach uses photographs or illustrations, respondents can visibly recognize and recall the places in question (Manning & Freimund, 2004).

Many studies investigating visitors’ crowding norms have been conducted using field and web-based surveys. However, researchers have given limited attention to explaining how crowding norms differ between fields and potential visitors. When determining the appropriate carrying capacity in natural recreation areas, it is necessary to consider both visitor types’ crowding norms; this paper investigates these, providing suggestions for determining the appropriate carrying capacity.

## Material and Methods

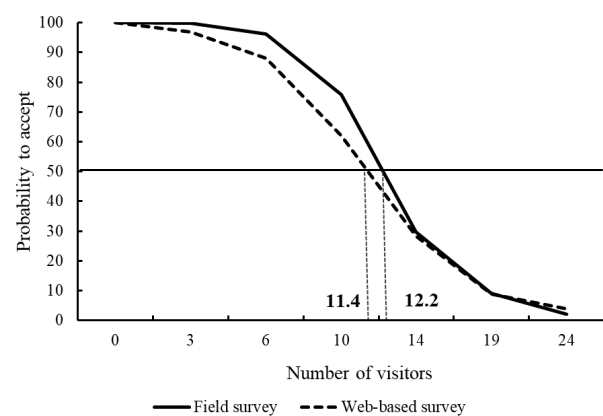
### Study area

The case study site was the Shiretoko World Heritage Site. Shiretoko has been a World Heritage Site since 2005 and is located in the northeastern part of the Japanese island of Hokkaido. It has unique ecological characteristics (e.g., brown bears, foxes, flora), making it a place visited by over 1 million visitors every year.

## Data collection and questionnaire design

Both field and web-based surveys were conducted to compare the results of field and potential respondents. A field survey was conducted at Shiretoko, yielding data from 382 respondents in September 2020. The web-based survey was conducted in October 2020 using a platform developed by a research company. Responses were obtained from registered survey panel members who met the inclusion criteria, and a total of 226 responses were used for analysis.

A short question format was applied to elicit both visitors’ crowding norms. This format presents all seven photographs with varying numbers to respondents and asked them to choose one photograph showing an acceptable limit (Aikoh et al., 2018). Based on past studies, the maximum density was estimated and the number of each photographs was determined. In the case of the Shiretoko Kamui-Wakka waterfall site, it was set to 0, 3, 6, 10, 14, 19, 24. From these data, we produced acceptability curve investigating both respondent types’ crowding norms.



## Results

Figure 1 shows the acceptability curve of the crowding norms from the field and web-based survey respondents using short question format. The acceptability curve shows the cumulative ratio of respondents who chose the most acceptable photograph among seven photographs (Aikoh et al.,

2018). The x-axis represents the number of people in the photograph, and the y-axis represents the acceptance probability.

The probability to accept decreased as the number of people in the photograph increased in both types' of respondent. We also identified crowding norms for both respondents. As a result, it was found that respondents from the web-based survey had lower crowding norms for the 50% acceptable limit compared to field survey respondents.

### **Discussion**

In this study, we were able to elicit both field and potential visitors' crowding norms using field and web-based surveys. We examined both visitor types' crowding norms using short-format questions, comparing their results. It is necessary to understand the awareness of crowding norms of both field and potential visitors to alleviate crowding in natural recreation sites.

### **References**

Aikoh, T et al. 2018. <https://doi.org/10.1016/j.jort.2018.10.006>. Manning, R. E., & Freimund, W. A. 2004. <https://doi.org/10.1080/00222216.2004.11950036>.