

Monitoring the number of urban forest visitors and their attachment in Sapporo, Japan

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Introduction

Urban forests not only provide physical and biological benefits, but also contribute to human well-being in urban environments (Dwyer *et al.*, 1992). Recently, the social aspects of urban forests have garnered more attention from researchers and officials. The benefits of visiting urban forests constitute one of the ecological services of urban biodiversity. The increasing demand for and accessibility of urban forest settings have led to recreational impacts on environments and conflicts among various types of visitors (Arnberger, 2006). Managers and planners need precise data, including usage levels, demands and satisfaction of visitors. Eder and Arnberger (2012) also emphasized the influence of place attachment on visitors and their attitudes. Visitors who reported being more attached to a place were more sensitive to social and environmental site conditions.

There are 75 kilometres of trails in suburban Sapporo, Japan. The Sapporo City Office manages these trails for various activities for all age groups. Biological features, scenery, recreational facilities and accessibility vary across the trails. Increasing and diversifying visitor demands have made the management of the trails more difficult. To address these changing demands, the Sapporo City Office managers developed a research project to monitor the number of visitors throughout the year and to solicit information about their attitudes.

Method

We installed five pyroelectric infrared counters (EcoCounter) at two trailheads on Mt. Maruyama and three trailheads on Mt. Sankakuyama from December 2012 to November 2013. Each day, the counters made hourly recording of the number of hikers who entered and left the trailheads. Direct observations of visitors were conducted at each trailhead every three days in the winter, spring, summer and autumn. From dawn to dusk, the observers recorded the number of visitors, and their gender, age, clothes and possessions.

During this same period, we distributed mail-back questionnaires to hikers at Mt. Maruyama and Mt. Sankakuyama. These surveys solicited information about their demographic characteristics, frequency of visits, motivation for visits, place attachment and willingness to participate in voluntary trail maintenance activities. We received 821 valid responses, an effective response rate of 60.3%.

Results and Discussion

When we compared the number of visitors per hour as counted by the infrared counters and the observers, the correlation coefficient was greater than 0.9 at each trailhead. This indicates that the number of visitors recorded by the infrared counters throughout the year was highly accurate. Figure 1 shows the weekly number of visitors during the research period. Spring was the high season, and autumn was the next most popular period, but even in winter, there was a substantial number of visitors.

Fluctuations in the number of visitors varied between the trailheads. Multiple regression analyses showed that the factors that influenced the number of visitors also varied between the trailheads and among seasons. Commonly, the temperature and the day of the week had the strongest effects on the number of visitors.

Most of the visitors were residents of Sapporo, and they tended to come from neighbouring communities. We placed visitors into three categories based on the frequency of their visits: frequent visitors, periodic visitors and newcomers. Some of the frequent visitors hiked the same mountain trails every day for exercise, and they were more likely to live in nearby communities and be older. Periodic visitors were more focused on observing nature and sightseeing, whereas newcomers often visited to practice.

Frequent visitors reported stronger place identity with and dependence on the areas they visited. They also reported having more experiences and a greater willingness to participate in voluntary trail maintenance.

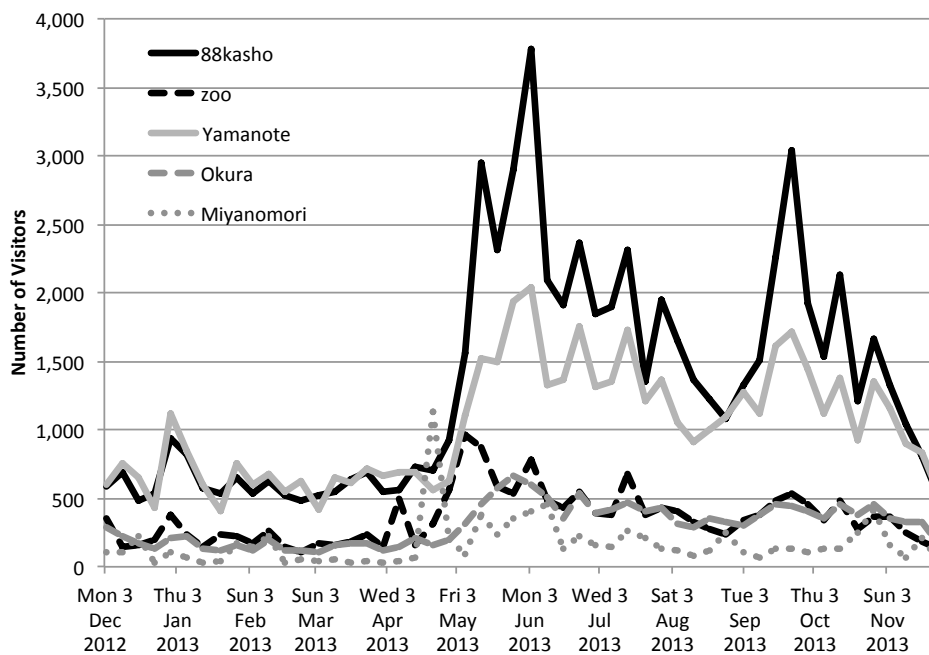


Figure 1: Weekly number of visitors counted at urban forest trailheads.

Conclusions

Pyroelectric infrared counters showed high accuracy in counting visitors to trailheads, and they made monitoring visitor use possible throughout the year. A certain number of urban residents visited nearby forests for exercise even in the winter when it had snowed. The factors that influenced the number of visitors varied between the trailheads. Factors that are important in remote protected areas differ from those that are important in suburban forest areas (Aikoh *et al.*, 2012), where the accessibility and convenience of the trailheads are the most important factors.

Visitors were classified into frequent, periodic and new visitors to the suburban forest areas. We found correlations between the frequency of visits, place attachment and willingness to participate in voluntary trail maintenance.

This information will be helpful to managers and officials, when they promote public participation in urban forest management.

References

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