

# Monitoring Trampling Impacts in the Disposal of Human Waste at Campsites and Visitors' Attitudes to a Carry-out System

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## Introduction

Several camping impacts have been reported on campgrounds in natural settings (Hammit & Cole 1998). These impacts include trampling of vegetation, soil erosion, littering, growth of social trails, damage to trees and creation of fire sites. One study showed the enlargement of a campsite and increased vegetation loss around some designated campgrounds in Daisetsuzan National Park, Japan (Aikoh et al. 1995). This provoked the necessity of further monitoring and the establishment of a campground management strategy by park managers. Also, the number of visitors and managers who cared about the impact of feces and toilet paper around the campgrounds increased.

Recently, the lack of toilet facilities in mountain huts and campgrounds has become an urgent management issue in national parks in Japan. Most mountain huts have only latrines; therefore, there is concern about the potential contamination of drinking water. Feces and toilet paper are found around designated mountain campgrounds without toilet facilities. The Ministry of Environment and some municipality governments have provided financial support to the private owners of mountain huts, and promoted new sanitary technology developments in remote areas. However, replacing or installing toilet facilities in remote areas, and the maintenance of such facilities, is very costly. Due to a lack of finances, some municipalities are promoting the carry-out system, which involves the distribution of free plastic bags to hikers, and the collection of the carried-out bags. The key to the success of this system is the compliance of visitors.

The purposes of this study are to monitor the impact of feces on campgrounds without toilets, and investigate the compliance of visitors to the human waste carry-out system procedures.

## Methods

There are nine shelters and 12 designated campgrounds in Daisetsuzan National Park. Two shelters and seven campgrounds have no toilet facilities. The popular campgrounds, Minaminuma and Bieifuji, were investigated using aerial photographs. Photographs taken in 1977, 1982, 1987, 1992 and 1997 by the Forestry Agency were scanned using a flatbed scanner. Digitized bare grounds and paths around campgrounds were traced and mapped. Length of paths and the size of bare ground were calculated. In 1999, we conducted an on-site survey to verify the maps, and assessed the existence of feces and toilet paper around the campsites.

Visitors' attitudes to the carry-out system were investigated in 2001 and 2005 at the trailhead of Mt. Rishirisan, in Hokkaido. The towns of Rishirifuji and Rishiri, near Mt. Rishirisan and its trailheads, have been promoting a trial of the carry-out system since 2000. Before this promotion, much feces and toilet paper were found around the summit, huts and lookout points. The promotion consisted of distributing free plastic bags at trailheads and hotels, and collecting used plastic bags at trailheads. Most Japanese hikers are not accustomed to such a system, therefore the managers and town officials are now concentrating on the attitude and compliance of hikers. In 2001, 218 hikers and in 2005,

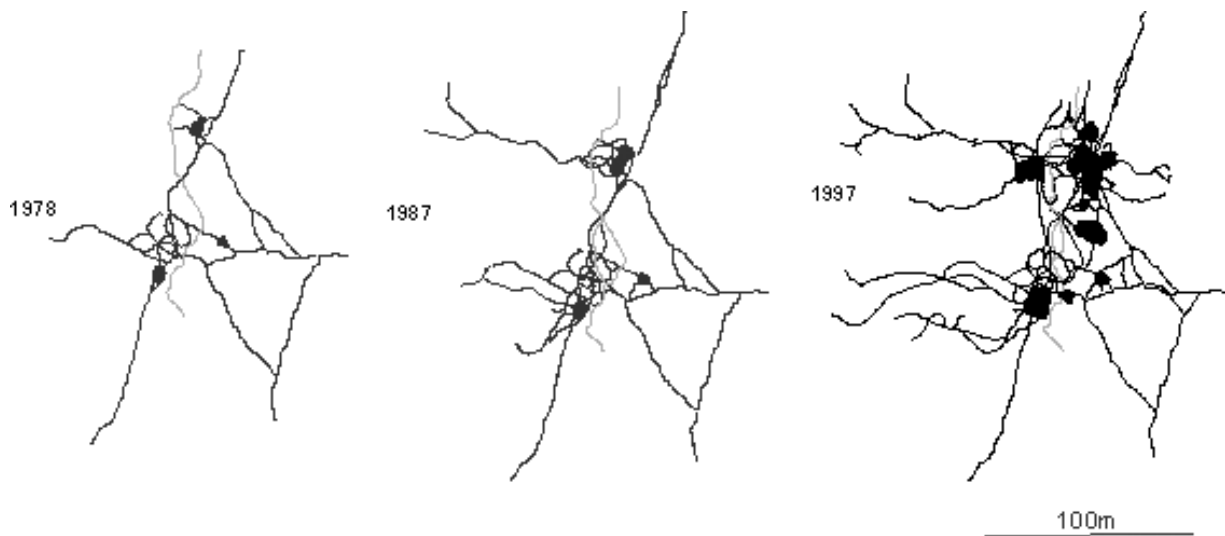


Figure 1: Change of campsites and social trails around Minaminuma campground.

125 hikers were asked to answer a questionnaire on their recognition of camping impacts and their attitude to the carry-out system.

## Results

Minaminuma campground is close to popular Mt. Tomurausi (altitude 1,960 m). It takes about five hours on foot from the nearest trailhead to reach it. There are eight bare campsites, and many social trails stretching radially from them. We found much feces and toilet paper at the end of each social trail. Aerial photographs showed that the number of bare sites increased from three to eight, the area of bare ground increased from 120 to 1066 m<sup>2</sup>, and the length of paths increased from 876 to 2409 m in the last two decades (figure 1). The same trends were found in the Bieifuji campground.

The visitors who complained about encountering feces and toilet paper in Mt. Rishirisan decreased during the past five years, from 23% to 6%. Visitors who recognized and approved of the carry-out system increased from 51% to 78%. However, the reported willingness to pay for the carry-out system was insufficient to cover the actual cost of plastic bags.

## Conclusion

Enlargement of campsites and growing social trails are indicative of the disordered conditions of the campgrounds. It is necessary to restrict tents to

designated sites, and to educate visitors about low-impact camping practices. Visitors to Rishiri Island appear to be aware of the carry-out system. However, cost sharing of distribution and collection of plastic bags is becoming a controversial subject.

## References

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