

Users' impacts on the Kuro-dake Campsite in Daisetsuzan National Park

and the necessity of proper management for the future

(大雪山国立公園, 黒岳野営指定地への利用者のインパクトと将来の適切な管理の必要性)

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The current Kuro-dake Campsite (1,895 m a.s.l.) in Daisetsuzan National Park, which is situated in the alpine environment, is one of the most popular campsites in the park. It has been used without any formal management since its opening in 1992, whereas many sites in other national parks have received formal management (this study calls them campgrounds). Recently, evident soil erosion and crowding problem have appeared on the campsite. This study aims to gain more insights into the soil erosion and crowding situation on the Kuro-dake Campsite and to suggest a corresponding strategy for the future management.

This study combined both natural science and social science. A detailed topographic map was created in 2017 by using pole photogrammetry to understand the condition of the ground surface on the current campsite. For the long-term changes of the ground surface, a series of aerial photographs were used for mapping. Use level of the campsite was evaluated by the field observations and secondary data collection. Campers' perspectives on the condition of the current site and attitudes toward introducing formal management were identified through a questionnaire survey. An interview survey with officers of related organizations were conducted to learn about their attitudes toward implementing management of the campsite. Meanwhile, interview survey with park managers of three major national parks in Taiwan were also conducted to learn about the details of their reservation system for campground management and its effectiveness.

Two gullies were identified on the topographic map of the current campsite. From 2012 to 2017, the size of the campsite increased by 48 m<sup>2</sup>. The daily use level on busy days was nearly 7 times as high as the average use level of the year. On those busy days, some campers pitched their tents on the nearby trails, although it is not allowed. The interviewees indicated that the optimal number of tents (acceptable maximum number of tents) to be pitched in the campsite was a median of 25 tents. However, the actual number of tents on busy days often exceeded 30. Dealing with the problems of the crowding and further enlargement of the impacted area is urgent. Among the suggested options, (1) closure of the site should be rejected (94% of users opposed to the closure); (2) limit the use of the site was supported only by 37% of users; and (3) expansion of the site will create further vegetation loss and soil erosion. Therefore, this study recommends introducing the reservation system as Taiwan's national parks adopt. This means that the current Kuro-dake Campsite needs to be upgraded from an unmanaged campsite to a campground with management.