7 Aletsch Forest in the UNESCO natural World Heritage site Swiss Alps Jungfrau-Aletsch: changes of visitor flows and vegetation in the last ten years

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Introduction

The Aletsch Forest in Switzerland lies within the UNESCO natural World Heritage site Swiss Alps Jungfrau-Aletsch and is one of the oldest of its kind. The 410 ha large forest is protected as a cantonal forest and nature reserve as well as a federal wildlife reserve. The private nature conservation organization Pro Natura manages the area on behalf of the canton of Valais. Recreationists greatly value this pristine nature and each summer many people visit the forest. Management of the Aletsch Forest therefore faces the challenge of finding a balance between use and protection. Utmost priority has the undisturbed natural development of the forest. It is prohibited to leave official trails or resting areas. Still, a sustainable recreational use should be possible. To navigate between these demands and to make effective visitor management decisions, the area management needs empirical data to characterise recreationists (Clivaz et al. 2013) as well as the natural setting (Stankey et al. 1985).

In 1978, a first study was conducted to investigate recreational usage within the forest. Follow-up studies in 1994 and 2008 (Kernen et al. 2010) found an ongoing high pressure on natural resources. Additionally, in 2008, a newly-built pedestrian suspension bridge over a canyon was opened, which soon became a highlight for many recreationists and changed the spatio-temporal travel pattern within the protected area. Once undisturbed areas suddenly faced high recreational pressure, which led to the degeneration of sensitive and ecological valuable vegetation in some of the newly-used areas (Corrodi 2011). Therefore, management established in 2012 a new official, with posts and information boards marked, resting area to guide visitors and to protect sensitive vegetation outside the resting area from trampling and allow it to recover.

The goal of our study was to answer the following questions: 1) How have visitor numbers changed in the past ten years? 2) How has the vegetation inside and outside the then newly-established resting area developed? and 3) Was establishing the resting area an effective tool to guide visitors?

Methods

To automatically count visitors, four acoustic slab sensors were installed on main trails (including the trail leading to the suspension bridge) between 26. 6. 2019 and 17. 10. 2019. These numbers were used for descriptive statistics and model building. Additionally, a survey including 431 questionnaires was conducted. Participants were asked to mark their hiking route on a sketch of the area, which allowed the elimination of multiple visitor counts resulting from passing several counting sensors.

Vegetation and its level of damage in and around the resting area was re-surveyed at 20 gridpoints, established in 2011 during a previous study (Corrodi 2011). The perimeter was mapped in predefined vegetation units. In each patch, the percentage of bare soil (soil on which vegetation could grow theoretically but does not because of trampling) was assessed. For example, a value of 30 % means that inside a patch 30 % of the area was bare soil and 70 % was covered by vegetation.

Results

During the summer of 2019 approximately 26’000 visitors were counted. Usage was highest around noon, during the summer holidays and on sunny, warm days. Weekdays had no influence on visitation rates. These were among the highest inside the protected area on trails around the suspension bridge. In a comparable period in 2008, when the suspension bridge had just been opened, around 55’000 visitors were counted (Kernen et al. 2010) with similar temporal usage patterns compared to 2019. The 2008 spatial distribution (Kernen et al. 2010) manifested again in 2019. The section around the suspension bridge received a lot of visitor attention.

The re-surveyed grid-points showed that in 2019 the vegetation outside the resting area was intact, while vegetation inside was damaged. Outside the resting area herbaceous plants and mosses dominated, inside shrubs and trees, which are less sensitive to trampling, did. Compared to 2011 (Corrodi 2011), plots outside the resting area regenerated and plots inside degenerated. Additionally, the classification of vegetation units and the assessment of bare soil in each patch showed that patches inside the resting area had significantly more bare soil than patches outside of it (Figure 1).

Conclusion

Visitor numbers, compared with those in 2008, dropped dramatically. However, in 2008 the newly-opened suspension bridge generated a lot of visitor attention and visitor numbers were presumably higher than during a regular hiking season. Additionally, in 2019, a local attraction, the hotel Villa Cassel, was closed due to renovations. These two circumstances led to different initial situations and a re-survey of visitor numbers during a regular hiking season is highly recommended.

As a result of the opening of the suspension bridge in 2008, the once remote area with the picturesque lake has become an attraction. Establishment of the resting area led to a spatial concentration of visitors. This has led to damaged vegetation and bare soil inside the resting area. However, vegetation outside of it regenerated since 2011 remarkably.

We conclude that establishment of the marked resting area with information boards was a successful tool to guide visitors in the sensitive environment, since the vegetation outside the resting area was able to regenerate. Finally, locations of new resting areas must fulfil two criteria: 1) vegetation must not be highly valuable or sensitive because (some) damage is inevitable and 2) be attractive for visitors to be accepted (ROS, Nilsen & Taylor 1997).

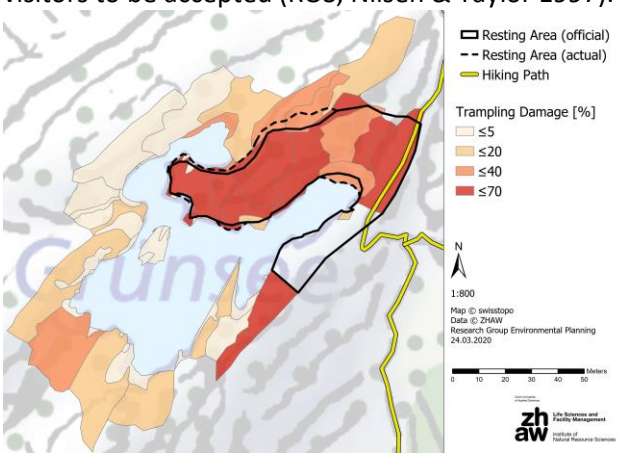

Figure 1: Percentage of bare soil in the area investigated.

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