▲ Hochschule Harz

Bachelorarbeit

# EFFECTS OF FOREST DISTURBANCES ON ACTIVE TOURISM

## AN EMPIRICAL ANALYSIS USING THE EXAMPLE OF THE SAXON SWITZERLAND NATIONAL PARK

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# List of Abbreviations

BfN ..... *Bundesamt für Naturschutz*
IUCN ..... *International Union for Conversation of Nature*
TTSSW ..... *Tourismusverband Sächsische Schweiz e.V.*

# 1 Introduction

## 1.1 Identification of the Research Problem

In today's travel habits of Germans, nature-based recreation plays a significant part as more than 80 per cent of them report that being in nature helps them unwind.[1] Numerous factors, such as rising health consciousness, Covid-19, and urbanisation, have strengthened this trend.[2] However, more frequent forest disturbances threaten recreational areas such as national parks, biosphere reserves, and nature parks. Over time, disturbances, including drought, fires, floods, windstorms, illnesses, and insect pests, have altered the ecosystem's natural environment.[3] As a result, there is a risk that if forest disturbances progress, tourists may consider the natural product in protected places unsatisfactory and refrain from visiting. Therefore, research is required to investigate the effects of forest disturbances on the travel behaviour of visitors in protected areas like national parks. The following thesis will focus on the Saxon Switzerland National Park because, on the one hand, it has received less attention in the literature than other national parks, such as, for instance, the Bavarian Forest National Park.[4] On the other hand, it is highly threatened by, for example, forest fires, storms, and the bark beetle. Therefore, it provides an effective illustration of these issues. For instance, Saxon Switzerland was one of the most impacted regions by forest fires in 2022.[5] Moreover, this national park differs from others due to its distinctive rock and stone landscape.

## 1.2 Aims and Objectives

The aim of this bachelor thesis is to identify and assess changes in the travel behaviour of active tourists due to forest disturbances in the Saxon Switzerland National Park. Furthermore, this outcome serves as a foundation for developing recommendations for national park management. To achieve this, the

[1] cf. Hermes et al. 2021
[2] cf. Bauhus et al. 2021, 113
[3] cf. Seidl et al. 2017, 3
[4] cf. Müller et al. 2008, Müller and Job 2009, Müller and Imhof 2019
[5] cf. Bartsch, October 28, 2022

thesis collects data that provides insights into travel and information behaviour, as well as the opinions of visitors to the Saxon Switzerland National Park. This is accomplished through the use of an empirical method, namely a standardised online survey. Based on these aims and objectives, the following research questions were formulated:

- Q1: How do the perceived forest disturbances affect the travel behaviour of active tourists in the Saxon Switzerland National Park?
- Q2: What are the opinions of active tourists towards forest disturbances?
- Q3: What are the implications for managing natural disturbances in National Parks?

## 1.3 Thesis Structure Overview

After the introduction, the thesis consists of seven main parts, with most of them containing subchapters. At first, the theoretical framework serves as a foundation for the empirical research analysis by providing an overview of the state of knowledge regarding the study's research topic. Chapter two focuses on forest disturbances, specifically forest fires, storms, and bark beetles. The third chapter defines the term national park and displays an overview of the study area, Saxon Switzerland National Park. Chapter four presents basic definitions and facts about active and nature tourism, particularly hiking, climbing, and biking tourism in Germany and the Saxon Switzerland National Park. Furthermore, it also discusses the extent to which forest disturbances affect tourism. After an overview of the empirical method in the form of a quantitative survey, chapter six presents the primary research's results. The main findings and hypotheses are then discussed, and based on them, recommendations for the national park administration are derived. As a final topic in this chapter, the limitations of this thesis are highlighted. Finally, the conclusion summarises the work.

# 2 Forest Disturbances

To provide a clearer understanding of the current forest situation in Germany, this chapter will define the term forest disturbances, highlight specific weather and natural conditions, and outline their potential future developments.

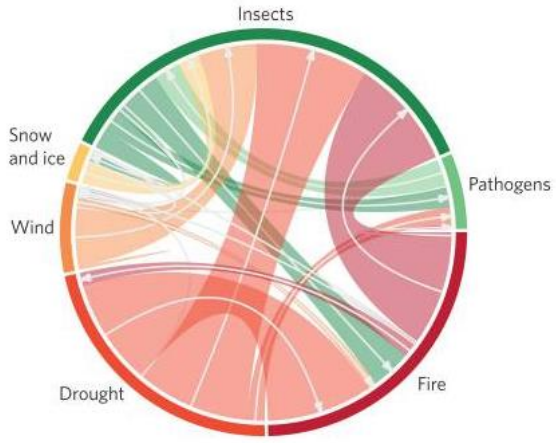
## 2.1 Definition Forest Disturbances

Forest disturbances such as storms, fires or insects alter ecosystems' composition. The term itself refers to "a change in disturbance in response to a change in climate".[6] However, disturbances can also be understood as a single event that abruptly and noticeably changes an ecosystem's structure.[7] In a well-functioning ecosystem, these occurrences can also bring a positive effect as they ensure a reorganisation process.[8] Nonetheless, the following chapters will demonstrate how these disturbances have increased in frequency, severity, and size in recent years. In the face of climate change, literature has identified six major forest disturbances: "fire, drought, wind, snow and ice, insects, and pathogens".[9] This thesis will primarily concentrate on fire, wind, and the bark beetle, as these are the most prominent issues in the Saxon Switzerland National Park.[10]

Moving on, it is crucial to consider interaction effects when dealing with forest disturbances. These effects reflect the relationship between disturbance agents, where their mutual interaction can reinforce forest disturbances to a greater extent (see Figure 1).

[6] Seidl et al. 2017, 3
[7] cf. Sächsisches Staatsministerium für Umwelt und Landwirtschaft 2015, 66
[8] cf. Seidl et al. 2017, 2
[9] Seidl et al. 2017, 3
[10] cf. Sächsisches Staatsministerium für Energie, Klimaschutz, Umwelt und Landwirtschaft 2021, 4

**Figure 1: Interaction between forest disturbance agents[11]**




The outer circle represents the proportion of interaction in the viewed literature, while the flows in the inner circle depict the relative distribution of forest disturbance interactions. Furthermore, the arrows indicate in which direction the influence occurs. For instance, extended periods of drought disrupt trees' natural defence mechanisms, making breeding for bark beetles easier.[12] Therefore, the following sections will focus on the selected forest disturbances while considering the relevant interaction effects.

## 2.2 Forest Fires

Although ecosystem dynamics consider forest fires essential components, climate change is anticipated to significantly increase the intensity and length of the fire season in several regions worldwide.[13] Rising temperatures and lower precipitation in spring, summer, and fall contribute to the increased risk of forest fires in Germany.[14] This change was particularly evident in 2022, a record year for forest fires when nearly 4.300 hectares—five times the annual average—were burned.[15] Consequently, the world's forests with linked ecosystems are threatened massively. Possible consequences include, for example, loss of habitat and vegetation for plant and animal species. Moreover, forest fires

[11] Seidl et al. 2017, 15
[12] cf. Seidl et al. 2017, 14f.
[13] cf. IPCC 2014, 51
[14] cf. Umweltbundesamt 2022
[15] cf. Deutscher Städte- und Gemeindebund, August 31, 2022

can also alter soil composition and nutrient availability, which can affect the survival and growth of plant species.[16]

Such fires occur when three elements are present: heat, fuel, and oxygen. A chain reaction spreads the fire when heat from a spark, lightning, campfire or other source ignites flammable materials like dry leaves and trees. Wind, topography, and human activity can influence the spread and intensity of forest fires. High winds and droughts increase the risk of forest fires and complicate their extinguishment. Nonetheless, forest fires in Germany are most often caused by human carelessness or unclear origins.[17]

Due to current conditions in many forests, the vulnerability to forest fires is increasing. A high concentration of dead and dry plant material, such as leaves, branches, and fallen trees, is considered more hazardous. Therefore, droughts, bark beetles, and weak trees also aid the spread of fire. Particularly, pine forests are susceptible to these circumstances and continue to fuel the fire with their easily ignited needles on the forest floor. Furthermore, a high level of touristic activities increases the risk of fires due to the increased potential for sparks and human error.[18]

## 2.3 Storms and Hurricanes

Storms are characterised by strong winds frequently accompanied by rain, snow, or other precipitation, as well as thunder and lightning. They develop through warm air rising and cooling, forming a low-pressure area. If favourable conditions include moist air and converging winds, they can further strengthen into a hurricane.[19] The Beaufort scale classifies the wind force by its speed and describes storms as a wind with a speed of at least 89 km/h. Severe storms like hurricanes reach a speed of over 118 km/h and cause widespread damage and flooding with intense storms and heavy rain (see Table 1). This

[16] cf. Minas 2019
[17] cf. Umweltbundesamt 2022
[18] cf. Bauhus et al. 2021, 27
[19] cf. Gardiner et al. 2013, 17

atmospheric disturbance is expected to extend especially to the western regions of Europe due to global warming.[20]

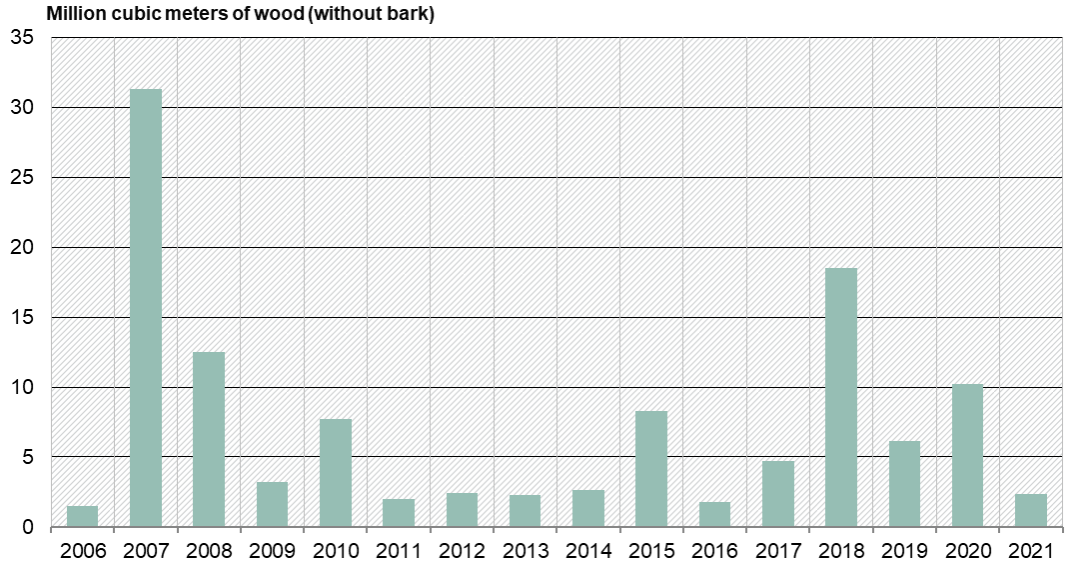
**Table 1: Beaufort Scale with Description Value[21]**

| Force (Beaufort scale) | Description | Equivalent speed in km/h | Example for effects on land |
|---|---|---|---|
| 0 | Calm | 0-1 | Smoke rises vertically |
| 1 | Light air | 1-5 | Wind direction indicated by puff or smoke |
| 2 | Light breeze | 6-11 | Leaves and wind vanes move |
| 3 | Gentle breeze | 12-19 | Wind moves thin branches |
| 4 | Moderate breeze | 20-28 | Wind moves twigs and thinner branches, lifts dust and loose paper |
| 5 | Fresh breeze | 29-38 | Small deciduous trees begin to sway |
| 6 | Strong breeze | 39-49 | Strong branches sway |
| 7 | Near gale | 50-61 | Whole trees move |
| 8 | Gale | 62-74 | Branches break from trees |
| 9 | Severe gale | 75-88 | Branches break from trees, minor damage to houses |
| 10 | Storm | 89-102 | Wind breaks trees, major damage to houses |
| 11 | Violent storm | 103-117 | Wind uproots trees, widespread storm damage |
| 12 | Hurricane | 118-133 | Severe devastation |

Such storms have repeatedly caused severe damage to forests in Germany. This leads to irregularly high amounts of damaged timber. Especially the years 2007 and 2018 were strongly shaped by storm damage and, thus more damaged timber felling (see Figure 2). Additionally, certain conditions often found in German forests are even more vulnerable to this forest disturbance. According to experts, human changes to tree species composition and trees being too young account for about half of all wind-related damage.[22] For instance, monoculture plantations of conifers, which are widely distributed in Germany, are more susceptible to damage. In addition, higher temperatures and increased rainfall in the winter months also lead to reduced tree sturdiness.[23]

[20] cf. Reindert et al. 2013, 1783
[21] cf. Cardia and Lovatelli 2015, 12; Deutscher Wetterdienst, n.d.
[22] cf. Seidl, Schelhaas and Lexer 2011, quoted in Bauhus et al. 2021, 25
[23] cf. Gardiner et al. 2013, 45

**Figure 2: Logging due to storm damage in Germany[24]**




Science has been unable to provide unambiguous statements about the future frequency of storms. For instance, severe storms are rather rare and variable events. This complicates the statistical evaluation due to insufficient long-term data. Other issues stem from storms occurring locally, which cannot be adequately classified in global simulations. Regardless, researchers suspect locally larger and faster storms as well as changes in storm tracks.[25]

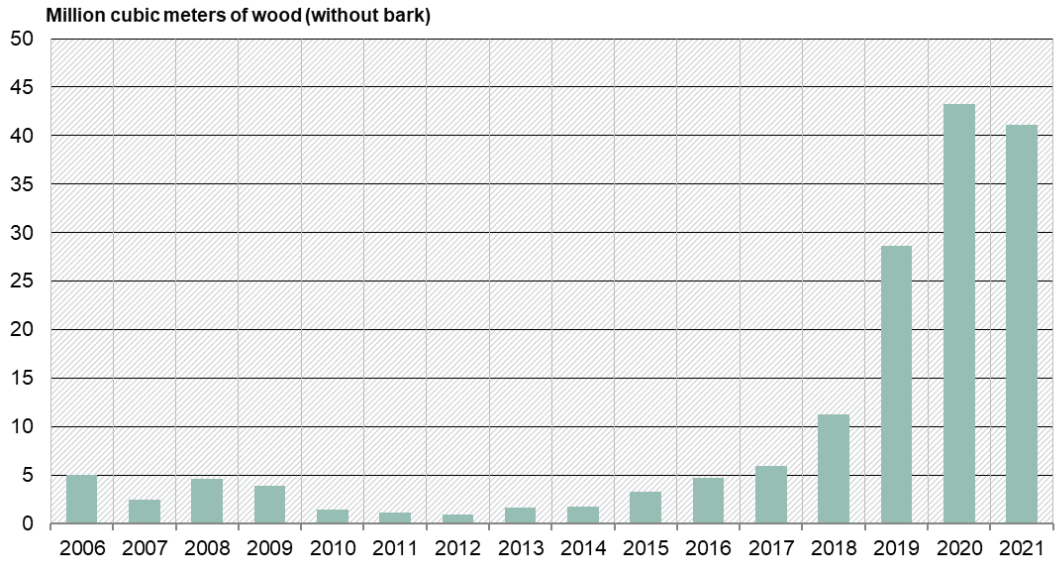
## 2.4 Bark Beetle

In a balanced ecosystem, the bark beetle represents an integral part of natural rejuvenation. For instance, the vast majority of the world's 6.000 species of bark beetles only reproduce in dead trees, contributing significantly to the cycling of nutrients.[26] However, the current outbreaks are far above normal levels, causing extensive encroachment into the ecosystem. Figure 3 depicts the logging of infected trees due to the increased insect development of insect outbreaks, including the bark beetle. According to the Federal Statistical Office, the amount of damaged timber cut in 2019 was nearly three times that of

[24] cf. Statistisches Bundesamt 2022b, 20
[25] cf. Gardiner et al. 2013, 110f.
[26] cf. Hlásny et al. 2019, 8

the previous year, with no end in sight. The predominant bark beetle, and therefore the source of most outbreaks in Europe, is the spruce bark beetle.[27]

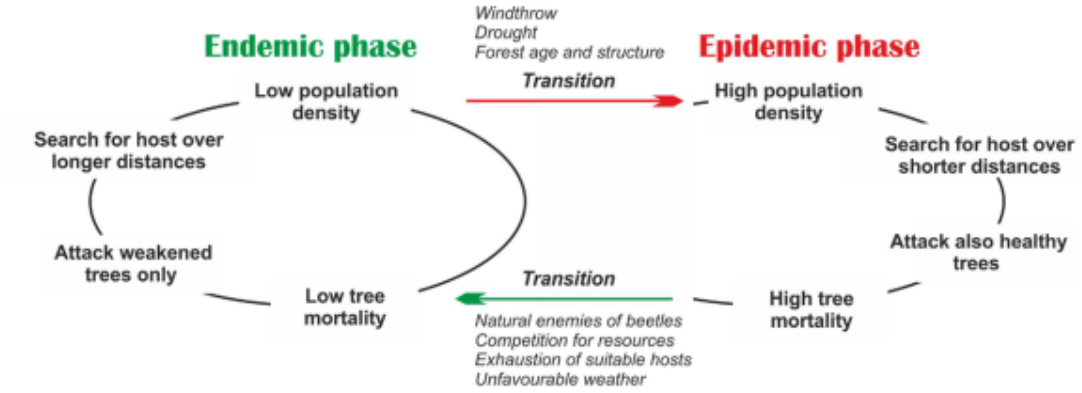
**Figure 3: Logging due to insect outbreaks in Germany[28]**




Moving on, Figure 4 illustrates the cycles of bark beetle infestation. During the endemic phase in a healthy forest, the insects primarily target weaker trees. The adult bark beetle that causes this infestation caves into the bark to create tiny chambers in the inner bark. After attracting mates to the chambers, the beetle places its eggs inside. Once the tree is full, the mated females emerge and move to less-crowded trees. After larval feeding and pupation, the young hatch and disperse to hibernation sites. Depending on the weather, a bark beetle generation cycle lasts between seven and ten weeks. Some species, such as the spruce bark beetle, can produce multiple generations yearly.

[27] cf. Hlásny et al. 2019, 8
[28] cf. Statistisches Bundesamt 2022a

**Figure 4: Scheme of Bark Beetle Population Dynamics[29]**




The triggering of the epidemic phase is not solely the result of natural causes but also human activities. Optimal conditions, such as drought, storm damage, or many weakened and damaged trees, allow the bark beetle to multiply by more than 15 times from generation to generation. Due to the climatic changes discussed in the previous chapters and the monocultural approach of many forests, the beetle does not need to search for a new host over longer distances. In this case, the beetle can also settle in healthy trees as disturbances prevent the trees from using all their defence mechanisms. In addition, many trees are also exposed to mass attacks, whereby defence is hardly possible. The outcome is typically the tree's death because the beetles obliterate the tree's food pathways and thereby prevent photosynthesis. Therefore, it is even more troubling that research indicates that beetle development rates are expected to rise due to climate change.[30]

Even though the forest disturbances shown here are primarily natural phenomena of nature, today's impacts are much higher. Furthermore, it is becoming increasingly evident that these disturbances negatively influence each other, with human intervention exacerbating the situation. As a result, the landscape is undergoing significant changes presently and will continue to do so in the future.

[29] Hlásny et al. 2019, 10
[30] cf. Hlásny et al. 2019, 9f.

# 3 National Parks

This chapter will provide insight into the protected area status of national parks by highlighting international and national classifications. Then follows an overview of the Saxon Switzerland National Park, which includes i.a. its geography, territorial division and the current forest state.

## 3.1 Protected Area Status National Park

Protected areas such as national parks represent natural heritage and are spread worldwide. The International Union for Conversation of Nature (IUCN) has developed a globally recognised system of protected area categories. Distinguished by management goals, national parks belong to the second category. Although it is usually the case, Category II does not include every national park worldwide if they do not fulfil the management objectives.[31] The IUCN defines these areas as “large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities”[32]. This definition underlines the need for educational and recreational activities to adjust to the overarching goal of preserving natural biodiversity. To meet these objectives, at least 75 per cent of the area must be in as near-natural condition as possible. Therefore, human intervention concentrates more on areas beyond these zones.[33]

By now, Germany has 16 national parks, which comprise around 0.6 per cent of the federal area (see Figure 5). Compared to, e.g., North America, with 36.7 per cent, this area share is relatively low.[34]

[31] cf. Dudley, Shadie, and Stoltonop 2013, 16
[32] Dudley, Shadie, and Stoltonop 2013, 16
[33] cf. Dudley, Shadie, and Stoltonop 2013, 35
[34] cf. Nationale Naturlandschaften, n.d.

**Figure 5: National Parks in Germany[35]**

Even though all 16 national parks are classified as IUCN category II, some are considered development national parks as they only meet some conditions and criteria for large-scale, unrestricted nature development.[36] In 2002, the Bundesamt für Naturschutz (BfN), which is the Federal Nature Conservancy Agency in Germany, established national legislation that reflected the IUCN's definition. According to their definition, national parks must be large and uninterrupted in the area and offer unique characteristics. Furthermore, they must meet the requirements of a nature reserve over a significant portion of their area and either not be significantly influenced by human activity or be developed to a state that allows natural processes to develop.[37] Similar to the IUCN definition, independent natural development is also the main priority. In

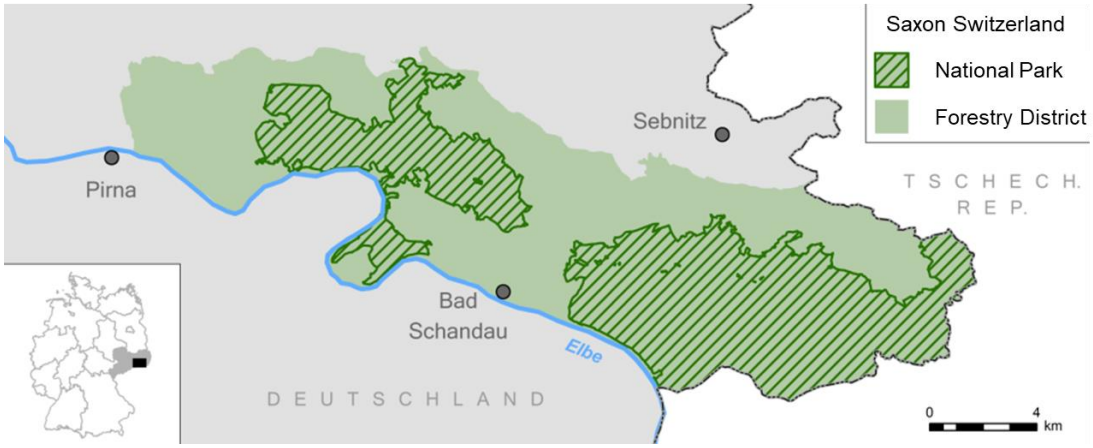
[35] Bundesamt für Naturschutz 2022
[36] cf. Bundesamt für Naturschutz, n.d.
[37] cf. Bundesamt für Naturschutz, n.d.

addition to the recreational and educational purposes that take place after natural development, the BfN also emphasises scientific purposes.[38] Despite being guided by the principle of "letting nature be nature"[39] to ensure strict protection, national parks are frequently faced with the dilemma of balancing conservation and growth.

## 3.2 Saxon Switzerland National Park

The Saxon Switzerland National Park is the only national park in Saxony and was established in 1990.[40] It reaches a size of 9.350 hectares, about 0.5 per cent of the total area of Saxony and is located around 30 kilometres southeast of Dresden.[41] Moreover, to ensure that environmental protection extends across borders, it cooperates with the Czech Bohemian Switzerland National Park, which has existed since 2000. Both national parks are, for the most part, state-owned.[42]

**Figure 6: Division of the Saxon Switzerland National Park[43]**

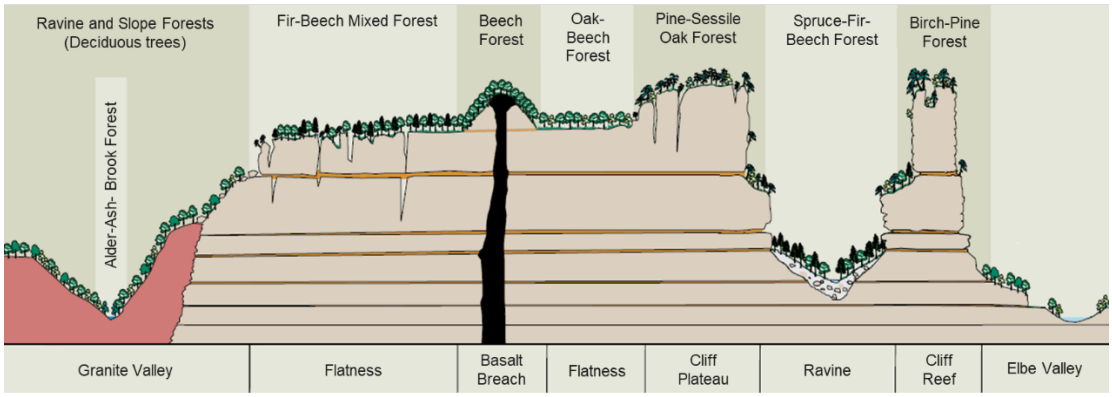



[38] cf. BNatSchG of July 29, 2009 (BGBl. I. p. 2542), as last amended by Article 1 of the Act of September 15, 2017 (BGBl. I. p. 3434). Accessed March 20, 2023. https://www.gesetze-im-internet.de/bnatschg_2009/__24.html
[39] cf. Author's translation from BNatSchG of July 29, 2009 (BGBl. I. p. 2542), as last amended by Article 1 of the Act of September 15, 2017 (BGBl. I. p. 3434). Accessed March 20, 2023. https://www.gesetze-im-internet.de/bnatschg_2009/__24.html
[40] Bundesamt für Naturschutz 2022
[41] cf. EUROPARC Deutschland e.V. 2012, 3
[42] cf. Staatsbetrieb Sachsenforst and Nationalparkverwaltung Sächsische Schweiz 2016, 6
[43] cf. Zimmermann 2020, 4

The National Park Administration has been under the control of the state enterprise Sachsenforst since 2006. On behalf of the state, it now maintains the national park landscape and the nearby landscape conservation area (see Figure 6). Therefore, it functions as the lower forestry authority and is a part of the Saxon State Forestry Administration.[44]

The area's characteristics include an unique landscape of sandstone cliffs, towering rock formations, and deep valleys formed by erosion over millions of years characterise the area. It is divided into two distinct sections by the Saxon Elbe Sandstone Mountains. Even though more than 90 per cent is covered with forest, this vast landscape of eroded sandstone makes it a rock national park. This type of national park is the only one of its kind in Germany. Furthermore, half of the park's vegetation currently consists of non-native spruce forests. As shown in Figure 7, there are also deciduous trees such as beech and oak in the region.[45]

**Figure 7: Forest Types of the Saxon Switzerland National Park[46]**




Moreover, the Figure illustrates the region's uniqueness as European low mountain ranges with a continuous transition between large topographic forms like flatness, table mountains, and rocky areas. Due to these conditions, the climate in the valleys is cool and humid in summer. Meanwhile, it tends to be

[44] cf. Staatsbetrieb Sachsenforst and Nationalparkverwaltung Sächsische Schweiz 2015, 24f.
[45] cf. Staatsbetrieb Sachsenforst and Nationalparkverwaltung Sächsische Schweiz 2016, 3ff.
[46] Staatsbetrieb Sachsenforst and Nationalparkverwaltung Sächsische Schweiz 2016, 7

warm and dry at higher altitudes. This is also called elevation level inversion. Because of this inversion of the Central European Forest elevation, the distribution of flora and fauna is also reversed.[47]

Furthermore, the national park is divided into three protection zones: nature zones A and B and maintenance zone. To regulate recreational use, a core zone with special behavioural requirements for visitors was also designated (see Table 2).

**Table 2: Zones in the Saxon Switzerland National Park[48]**

| Name of Nature Zone | Forest land | Description |
|---|---|---|
| Nature Zone A | 37.3 % | Largely unguided development of nature without utilization as well as without development and maintenance measures |
| Nature Zone B | 57.7 % | Temporary measures aimed at developing the areas in a way that will allow for undisturbed development in the future |
| Maintenance Zone | 5.0 % | Recreational areas and cultural landscapes, year-round inhabited or cultivated, developed properties without a conservation goal or requiring ongoing maintenance |
| Core Zone | 55.0% | Regulation of recreational use (access only on public or marked paths) |

True to the guiding principle of ensuring natural processes, the National Park Administration is now attempting to allow nature zones A and B, which cover more than half of the area, to develop naturally. However, this still classifies the national park as a development national park because the near-natural areas within the individual zones have not yet reached the required 75 percent. To support natural development, temporary silvicultural controls are in place in some areas, such as promoting native tree species like silver fir, oak, and beech in the extensive spruce forests.[49] Until 2030, the goal is to fulfil the requirement of IUCN and thus convert three-quarters into a near-natural state.[50]

[47] cf. Riebe, 78f.
[48] cf. Nationalpark Sächsische Schweiz 2019, 4ff.
[49] cf. Staatsbetrieb Sachsenforst and Nationalparkverwaltung Sächsische Schweiz 2016, 7
[50] cf. Nationalpark Sächsische Schweiz 2019, 5

However, forest disturbances that endanger the ecosystem are also becoming more frequent in Saxon Switzerland. Because of the drought years of 2018 and 2019, as well as numerous storm events that led to a significant increase in bark beetles, the forest's condition has changed significantly over the past few years.[51] Despite efforts to reduce spruce forests, a quarter of the national park area is still affected by bark beetle infestation. This resulted in the death of half of the spruce forests, approximately 2000 hectares.[52] Moreover, storms also repeatedly endanger safety in the national park. For example, in the fall of 2021, there were storms with wind speeds of between 75 and 90 km/h and up to 110 km/h at peak locations. Hanging trees, crown portions or branches pose an immeasurable risk even after the storm because they could fall anytime.[53] The weeks-long forest fire that crossed from Czech to Saxon Switzerland on July 25, 2022, drew much attention to the national park. Although the area affected by the fire on the German side was relatively small at 150 hectares (1.100 hectares on the Czech side), this still corresponds to five per cent of the national park area.[54] Topographical conditions, such as steep slopes, made fire extinguishment difficult in this area.[55] From this, it can be seen that forest disturbances are increasingly altering the forest's current state, and it remains unclear how the Saxon Switzerland National Park will look in the future.

[51] cf. Nationalpark Sächsische Schweiz 2019, 25
[52] cf. Tourismusverband Sächsische Schweiz e. V. 2021a, 18
[53] cf. Oberelbische Verkehrsgesellschaft Pirna-Sebnitz 2021
[54] cf. Staatsbetrieb Sachsenforst and Nationalparkverwaltung Sächsische Schweiz 2022, 10
[55] cf. Milde, December 28, 2022

# 4 Active and Nature Tourism in the Saxon Switzerland National Park

In previous chapters, it was established that tourism plays a crucial role in national parks. That includes the Saxon Switzerland National Park as well. To better understand tourism in the area, it is essential to examine the terms nature and active tourism. Therefore, this section aims to outline the main characteristics and concepts governing nature and active tourism, as well as how these subjects relate to each other and overlap. This is followed by an in-depth look at tourism in the national park.

## 4.1 Active and Nature Tourism

The growing importance of active tourism can be observed, for example, in the hiking tourism industry. About half of Germans enjoy hiking, making it one of the most popular vacation activities and lucrative travel markets.[56] Because of their relationship, nature tourism must be considered first before defining active tourism. Buckley defines nature-based tourism, which can be used interchangeably with nature tourism, as all forms of tourism that primarily relate to a relatively undisturbed natural environment or features.[57] Strasdas expands on this by emphasising that nature is the primary motivator for this type of travel.[58] However, other definitions either use nature and active tourism to some extent simultaneously[59] or indicate that it is impossible to differentiate between the two terms[60]. Therefore, there seems to be no clear distinction of active tourism in literature. Furthermore, the term can also be used synonymic with adventure tourism.[61] Buckley, for instance, refers to adventure tourism as "[t]ourism where the main attraction is an outdoor activity with an excitement-based component".[62] On the other hand, Dreyer proposes that active tourists

[56] cf. Stiebitz and Behrens-Egge 2012, 17
[57] cf. Buckley 2009, 6
[58] cf. Strasdas 2001, 6
[59] cf. Strasdas 2001, 6
[60] cf. Buckley 2009, 6
[61] cf. La Cruz and Tejedor Martínez 2019, 67
[62] Buckley 2009, 6

actively participate in various sports activities rather than focusing on just one while on vacation.[63] These two definitions illustrate that either the focus is on the individual setting or the activity itself is defined to achieve a clear distinction. Suitable for this thesis, the term active tourism will be used as nature outdoor activities practised on a trip or during a vacation. Although the definitional distinction is undetermined in the literature, the activities carried out are known and encompass a wide variety. These include winter sports like skiing or snowboarding, water sports like canoeing or sailing, and extreme sports like climbing. Hiking and cycling are two of Germany's most popular and rapidly growing activities.[64]

## 4.2 Tourism in the Saxon Switzerland National Park

The region Saxon Switzerland has a 200-year history of tourism. During the Romantic era, the area's scenery inspired many painters. Swiss painters developed the name Saxon Switzerland as the landscape reminded them of their homeland. In time, this area gained popularity as a travel destination in Germany. Furthermore, Saxon Switzerland became a significant climbing region at the end of the nineteenth century and is now one of the largest low mountain climbing regions.[65] Since February 23, 1991, the Tourismusverband Sächsische Schweiz e.V. (TTSSW) has been responsible for marketing the region, networking with the towns and service providers, representing the stakeholders' interests, and the region's strategic development.[66]

Hiking, climbing, and cycling are particularly important activities in Saxon Switzerland. Numerous hiking trails lead through forests and along cliffs. For example, the Malerweg (Painter's Way) and the Bastei, a natural rock bridge with panoramic views over the Elbe valley, are two of the most popular points of interest. There are approximately 400 kilometres of marked trails, with over 20

[63] cf. Dreyer 1995, 33
[64] cf. BTE Tourismus- und Regionalberatung PartG mbB 2016, 52f.
[65] cf. Riebe, 77
[66] cf. Tourismusverband Sächsische Schweiz e.V. 2021b, 10

kilometres of stairs and bridges. Furthermore, the national park offers a variety of hiking tours led by certified national park guides.[67]

Climbing is another popular activity in the national park, with approximately 13.500 climbing routes of varying difficulty. The sandstone cliffs in the park are well-known for offering excellent rock-climbing terrain. Visitors can take guided climbing tours from various climbing schools and tour operators.[68] In the national park, it is generally prohibited to camp or spend the night outside. However, from June to January, one can spend the night outdoors at one of the 58 designated free overnight places (Boofen), but only if the activity is directly related to climbing and does not compromise the national park's protective mission.[69]

With the Elbe Cycle Path, the national park is connected to the long-distance cycle path network. Although the national park has some restrictions on cycling, certain hiking trails are designated as bike routes, currently about 50 kilometres. As a result, the area provides cycling and mountain biking opportunities at various difficulty levels. To summarise, Saxon Switzerland National Park offers a wide range of outdoor activities and is a well-liked destination for tourists interested in nature and adventure because of its unique landscapes and distinctive rock formations.[70]

In terms of demand, the Saxon Switzerland National Park is one of the most popular in Germany. The annual visitor count has risen significantly over the years, reaching 3.5 million.[71] Furthermore, the Bastion's viewpoint is the most visited spot in Germany's national parks.[72] Examining Saxon Switzerland regarding its arrival figures (see Figure 8) reveals that these also increased before the Covid-pandemic in 2020. However, the region has yet to fully recover from the pandemic's aftermath. Additionally, events like the forest fire in 2022

[67] cf. Staatsbetrieb Sachsenforst and Nationalparkverwaltung Sächsische Schweiz 2016, 10
[68] cf. Tourismusverband Sächsische Schweiz e. V. 2021a, 38
[69] cf. Nationalpark Sächsische Schweiz, n.d.
[70] cf. Nationalpark Sächsische Schweiz, n.d.
[71] cf. Bartsch, October 28, 2022
[72] cf. Sächsische Zeitung, October 06, 2016

led to last-minute departures, cancellations, and fewer bookings the following fall.[73]

**Figure 8: Arrivals Accommodations in Saxon Switzerland from 2012-2021[74]**

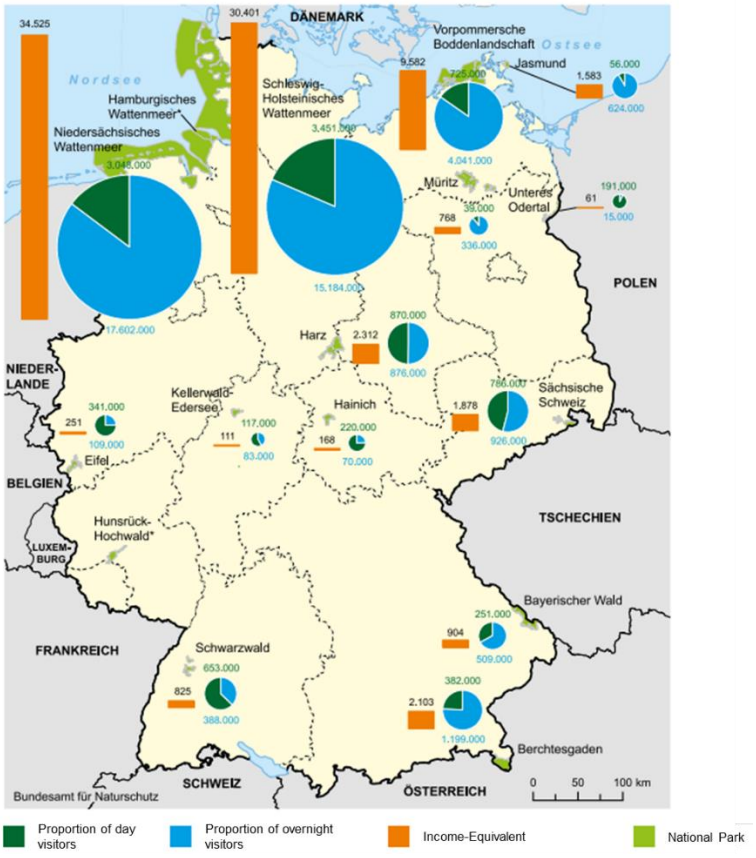
According to a study by Analyse & Transfer UG, the Saxon Switzerland National Park receives a wide variety of visitors with various visitor characteristics. The visitors include locals who visit the area regularly, as well as first-time and infrequent travellers. However, almost half of the respondents were from Saxony. The other age groups were evenly distributed except for the overrepresented 50- to 59-year-olds. This demonstrates that the national park is popular among people of all ages, which can be seen with gender as well.[75]

Moving on, the Saxon Switzerland National Park has a significant regional economic impact. The local tourist expenditure generates a gross sale of about 58.7 million €. After taxes and calculating direct and indirect effects, the total income is 29.3 million €. Therefore, tourists of the national park alone can

[73] cf. Süddeutsche Zeitung, November 25, 2022
[74] cf. Statistisches Landesamt des Freistaates Sachsen 2022a
[75] cf. Analyse & Transfer UG 2017, 26

provide income to 1.878 people.[76] Comparing the Saxon Switzerland National Park to others shows that it has a medium economic value concerning the key figures shown in Figure 9. Especially the coastal national parks show more significant economic effects. However, compared to similarly sized parks (e.g., Eifel or Black Forest), the Saxon Switzerland National Park generates more day visitors, overnight stays, and a higher income equivalent.

**Figure 9: Economic Effects of Tourism on National Parks[77]**




This shows that the national park's tourism value is crucial for the region and its inhabitants. Thus, forest disturbances are not only a risk factor for nature but also for the region's tourism potential. Firstly, disturbances such as fires are most common in the summer and fall months.[78] Therefore, an extended

[76] cf. Job et al. 2016, 24
[77] cf. Bundesamt für Naturschutz 2015
[78] cf. Bundesanstalt für Landwirtschaft und Ernährung 2022, 14

fire season often threatens the touristic high season with its economic importance. The tourism industry of Saxon Switzerland suffered significant losses amounting to tens of millions of euros due to the 2022 fire.[79] In addition to health concerns, reduced accessibility can diminish the tourist experience. Forest disturbances can cause damage to roads, bridges, and other infrastructure, making it difficult or impossible for tourists to reach their destination. Additionally, a region's aesthetic appeal can be lowered by losing vegetation and wildlife habitat, e.g., the grey, dead trees or even completely deforested areas caused by bark beetles. Due to the aesthetic loss, other regions have already registered a loss of recreational value, particularly when these are tourist attractions of particular importance.[80] The region of Saxon Switzerland also had to fear such consequences during the forest fire in 2022 when it spread near the Bastei (see Figure 10). However, in the end, all important sites were saved.[81]

**Figure 10: Forest Fire near the Bastei[82]**

The perception of danger associated with forest disturbances and the possibility of accidents can lead to decreased tourism. This can also happen in areas that are not directly affected, as was the case during and after the forest fire in 2022. Even in September, the region experienced a 22 per cent drop compared to the same month in 2021.[83] This suggests that these disturbances

[79] Staatsbetrieb Sachsenforst and Nationalparkverwaltung Sächsische Schweiz 2022, 4
[80] cf. Bauhus et al. 2021, 45–46
[81] cf. Bauhus et al. 2021, 45f.
[82] left Marko Förster, July 19, 2022, right Daniel Förster, July 18, 2022
[83] cf. Statistisches Landesamt des Freistaates Sachsen 2022b

directly harm tourist facilities like accommodations, restaurants, and other attractions, resulting in decreased revenue and economic losses for local communities. Therefore, it is essential to reiterate the need for further research into tourists' responses to the changes.[84]

[84] cf. Bauhus et al. 2021, 45f.

# 5 Methodology

This chapter provides an overview of the study's research methodology as well as its thorough application in practice.

## 5.1 Selection of Research Method and Sample

To answer the hypotheses and research questions, a quantitative research methodology was chosen. Quantitative research focuses on describing and operationalising conditions and relationships.[85] The survey is the most common method for gathering data in quantitative social research. Interviews carried out face-to-face, by telephone, writing or online are the most popular formats. In this study, a standardised online survey was chosen because it offered a good opportunity to ensure uniformity and objectivity.[86] However, the key reasons for this selection are the independence of time and place. Collecting opinions and behaviours requires a large number of participants, which is easier to achieve using an online survey. The fact that respondents prefer online surveys to other survey formats also supports this goal. Furthermore, it reduces the interviewer's influence on the respondent.[87] Lastly, the results can be compared more easily by standardising the online questionnaire, using mainly closed and semi-open questions.[88] The method's disadvantage is that it cannot reach people who do not have internet access. However, this condition is accepted as 88 per cent of Germans can now be reached via the internet.[89]

Because this group's basic population consists of 3.5 million visitors, only a partial survey could be carried out. This means that a sample is drawn from the population according to predefined rules.[90] The sampling method was applied to all Saxon Switzerland National Park visitors and, thus, all active tourists in the region. To ensure that only Saxon Switzerland National Park visitors

[85] cf. Raithel 2008, 11f.
[86] cf. Reinecke 2022, 951
[87] cf. Pötschke 2009, 77f.
[88] cf. Scholl 2018, quoted in Reinecke 2022, 951
[89] cf. Wagner-Schelewsky and Hering 2022, 1051
[90] cf. Stein 2022, 155

participated in the survey, it automatically stopped at the first question if the participant indicated they had never been there.

For the questionnaire distribution, channels with direct access to the target group were selected; namely, Facebook groups explicitly related to Saxon Switzerland or active tourism. In addition, the TTSSW agreed to distribute the survey through their channels, allowing it to reach out to their guests. Since it was not possible to implement a fully representative random sample within the scope of this bachelor thesis, a non-probability sampling technique called convenience sampling was chosen. This method gathers information from population members who are easily accessible and available to participate. Due to selection bias and outside influences, the sample is not sufficiently representative. Nevertheless, possible tendencies can be derived.[91]

## 5.2 Research Questions and Hypotheses

The following research questions and hypotheses were formulated on the basis of the research problem and the literature review.

**Q1: How do the perceived forest disturbances affect the travel behaviour of active tourists in the Saxon Switzerland National Park?**

The first research question holds a superordinate position among the others as it directly relates to the core topic of the thesis. It aims to investigate the impact of perceived forest disturbances on the travel behaviour of active tourists in the Saxon Switzerland National Park. This includes their perceptions of visiting the park, the likelihood of future visits, and changes in route planning. On this basis, additional questions were formulated to sharpen the focus of the thesis.

**Q2: What are the opinions of active tourists towards forest disturbances?**

[91] cf. Bruhn 2016, 95

The focus of this question was on clarifying the respondents' moods and opinions, as this also affects the quality of their visit. This makes it possible to determine the severity of respondents' concerns and identify their exact problems. It seeks to identify the severity of concerns among respondents, the problems they encounter, as well as the effect of forest disturbances on their attitudes towards the National Park Administration.

**Q3: What are the implications for managing natural disturbances in National Parks?**

The third research question aims to identify opportunities for improvement and derive recommendations through the survey. As forestry measures cannot be evaluated and recommended within the framework of this tourism-related bachelor thesis, this question primarily focuses on visitor communication and information behaviour.

The following hypotheses could be deduced from the research questions:

H1: The current forest condition does not meet the expectations of most respondents.

H2: Most respondents, who have frequently visited the national park, consider the forest damage to be of great concern.

H3: The majority of respondents perceive the changes caused by forest disturbances in the national park as negative.

H4: The majority of respondents who feel well-informed obtain information from multiple sources.

H5: The attitude towards regulations regarding forest disturbances by the national park is mostly negative.

H6: The Saxon Switzerland National Park will face a decrease in visitors in the future.

## 5.3 Questionnaire Design

The tool "SoSci Survey" (https://www.soscisurvey.de/) was used to create an online questionnaire consisting of 20 questions. Thematically, five sections focus on information about visits to the national park, opinions about forest disturbances and measures taken by the National Park Administration, behavioural intentions, informational behaviour, and sociodemographic characteristics. The questionnaire, which was only distributed in German, is included in Appendix 1.1 and 1.2 in German and English. To operationalise, e.g., attitudes and experiences, the items were evaluated using five-step scales, also known as Rating scales.[92] When a rating scale was inappropriate other closed or semi-closed-ended questions, often in multiple-choice, were used. The questionnaire also included a ranking of the main activities and a dichotomous response option on information demand to determine an exact preference. Generally, the questionnaire was condensed to reduce the number of dropouts. Appendix 1.3 contains additional information, including the content of each question, aim, and response options. Before the survey started, the questionnaire underwent a pretest completed by three individuals, one of whom was a member of the basic population. This demonstrated that the questions were logically, appropriately arranged and divided into main topics.

## 5.4 Data Collection and Analysis

During the research period of January 20 to March 4, 2023, the survey collected 236 questionnaires. However, ten respondents who claimed to have never visited the national park had to be removed. Further eleven questionnaires were discontinued in the first part of the survey and thus sorted out. Twenty-three additional questionnaires were later abandoned, resulting in a dropout rate of 14.4 per cent. Overall, the sample size consists of 212 participants. As mentioned above, the sample size is not representative of the

[92] cf. Reinecke 2022, 953

population. Nevertheless, they are presented subsequently to be able to read off possible tendencies.

Before starting the data analysis, a cleaning of the data set was required. This entailed, for instance, separating participants who indicated they had not yet been to the national park or verifying that the recorded data did not contradict each other. With the help of the program SPSS Version 27 and Microsoft Excel Version 2301, all valid questionnaires were coded, computed and analysed.

**Table 3: Selected Statistical Analyses[93]**

| | | |
|---|---|---|
| **Univariate Analysis** | Central tendency | Description of the data set using a single value designating the set's central position. |
| | Dispersion | Description of data set‘s spread degree |
| | Frequency distribution | Overview of one variable in absolute and relative frequencies |
| **Bivariate Analysis** | Contingency table | Overview of two variables in absolute and relative frequencies, demonstrating the correlation between the two variables |
| | Chi-Square-Test | A statistical test that determines whether the variables have a statistically significant relationship. Measures (such as Cramer's V, Phi, and Contingency Coefficient) can be used to express the relationship's strength and direction |
| | Pearson correlation | Determination of the linear relationship between two variables |

Table 3 displays an overview of the uni- and bivariate analysis methods used in this thesis with their definitions.

[93] cf. Mayer 2013, 117ff.; Raithel 2008, 137ff.

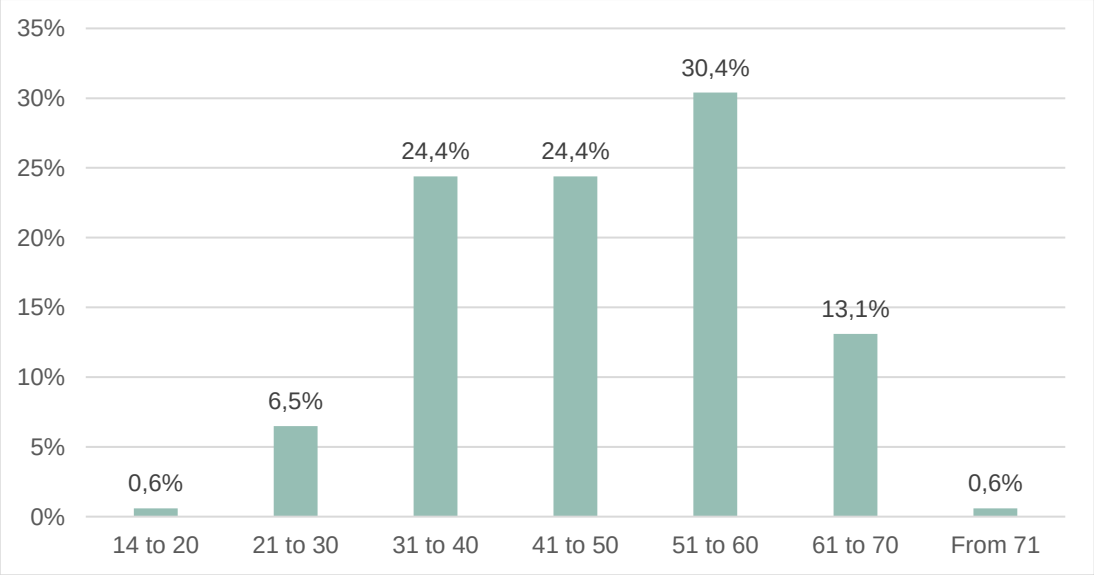
# 6 Results

This chapter presents the survey's results in their individual topics. However, not every data analysis is graphically displayed. All complete results can be found in Appendix 2.

## 6.1 Visitor Characteristics

This section analyses the demographical data and the travel behaviour of the sample regarding their national park visit. The age groups from 31 to 60 have the highest representation. Specifically, those aged 51 to 60 appear most frequently in the sample with 30.4 per cent. The numerically smallest groups are 14- to 20-year-olds and 71 and older (see Figure 11).

**Figure 11: Age Distribution[94]**

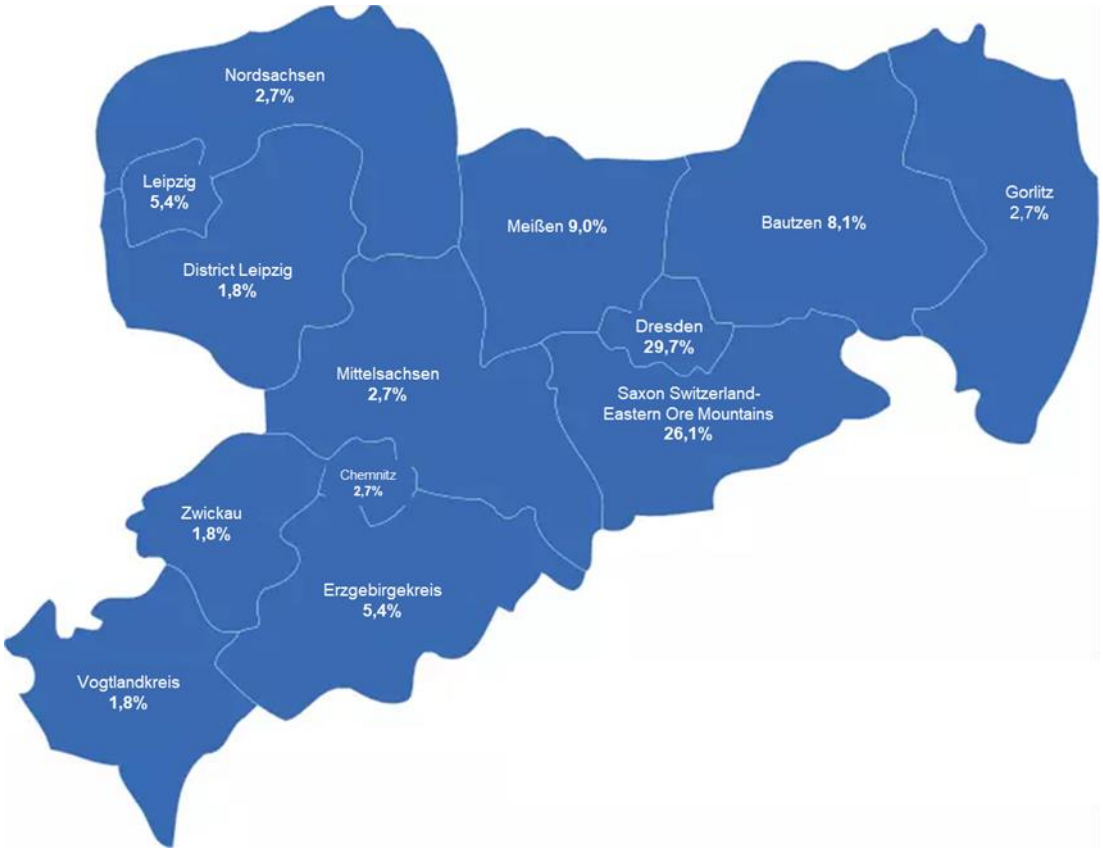



In terms of gender, women were the most represented at 54.8 per cent. Nevertheless, the distribution was relatively balanced because men accounted for 44.2 per cent. Meanwhile, only one person classified themselves as diverse, and another did not specify (see Appendix 2.1.18). The distribution of education levels shows that almost half of the participants hold a university degree.

[94] Own survey (N=168)

The second most common qualification is the Secondary school diploma (29.1 %), followed by the general university entrance qualification or other types of specialised qualifications (17.1 %) (see Appendix 2.1.20). Regarding their origin, more than half of the participants stated that they come from Saxony. Other frequently mentioned states were Lower Saxony (8.8 %) and Saxony-Anhalt (7.7 %) (see Appendix 2.2.19.1). When looking at the distribution of visitors within Saxony, they come primarily from the surrounding area and the neighbouring districts. (see Figure 12).

**Figure 12: Origin of Participants in Saxony[95]**

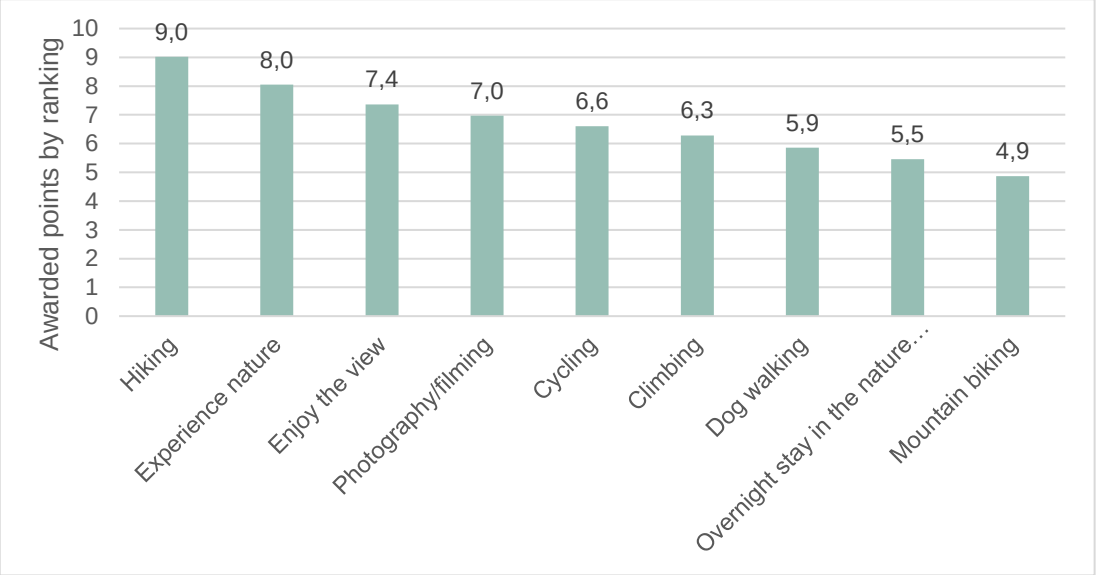



In response to the frequency of visits, the sample consists primarily of repeat visitors, with over 70 per cent indicating that they have visited the national park nine or more times. Based on the otherwise balanced responses in the

[95] Own illustration based on survey (N=111) with Ceramex Media GmbH, n.d.

remaining categories, the mean value falls into the 7 - 8 category (see Appendix 2.1.1). Furthermore, regarding the regularity of the visit, almost half of the visitors come to the Saxon Switzerland National Park several times a year. The second most frequent answer was once a year with 19.9 per cent (see Appendix 2.1.2). Over half of the respondents indicated that a day trip was their most recent type of vacation. This was followed by the vacation trip of four days or more, which accounted for 25.1 per cent of all trips. The least frequently selected trip was the short trip, at 19.4 per cent (see Appendix 2.1.4).

**Figure 13: Main Activities[96]**




Moreover, the main activities during the trip align with those typical of the region. Hiking was ranked the best by the respondents. The subsequent responses also show how important the nature aspect is to the respondents. Climbing and cycling, on the other hand, are only ranked fifth and sixth (see Figure 13). The ranking was created by assigning points according to participants' sorted order. The open answers are not included in the ranking

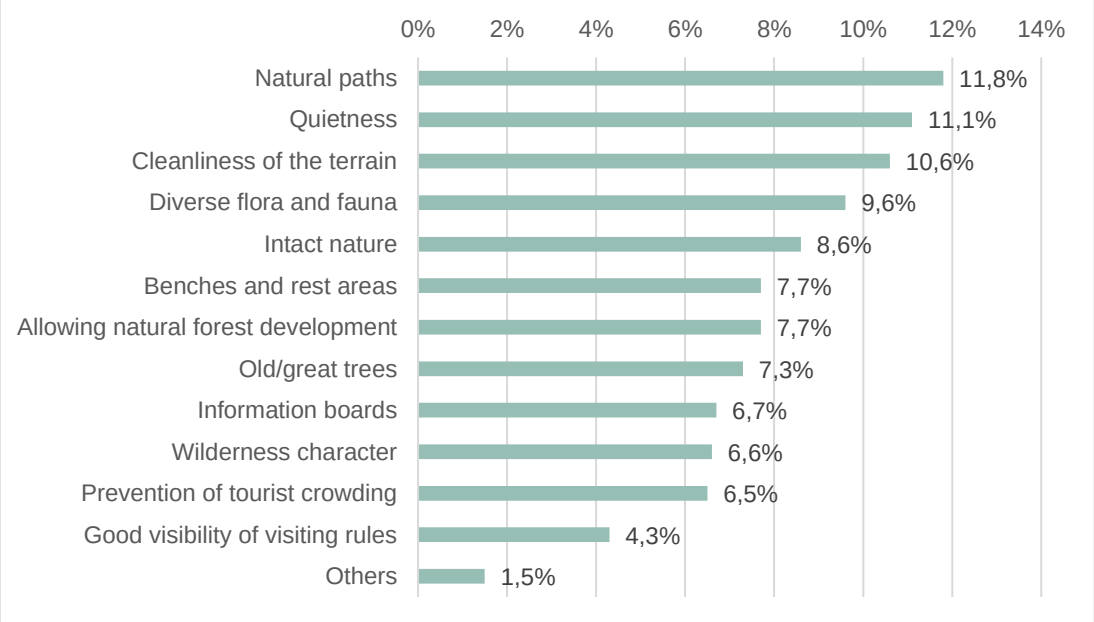
[96] Own survey (N=212)

because they were mostly mentioned only once and were not visible to the other participants (see Appendix 2.3.1).

## 6.2 Opinions and Preferences on the National Park

In this chapter, the opinions of the respondents on the national park and forest damages are depicted. Based on the expectations, the national park's naturalness is particularly important to the participants. For example, "natural paths" was chosen 167 times and "cleanliness" 150 times. The high value on the natural environment is further confirmed by often selected categories such as "diverse flora and fauna" and "intact nature". However, some contradictory opinion patterns can also be seen. For instance, on-site quietness was rated as very important, but preventing visitor overcrowding was not selected as often (see Figure 14). The open entries also revealed the differing opinions of the respondents. While some respondents anticipate increased tourism, others place emphasis on protecting nature and, in some cases, outright banning tourism (see Appendix 2.3.2).

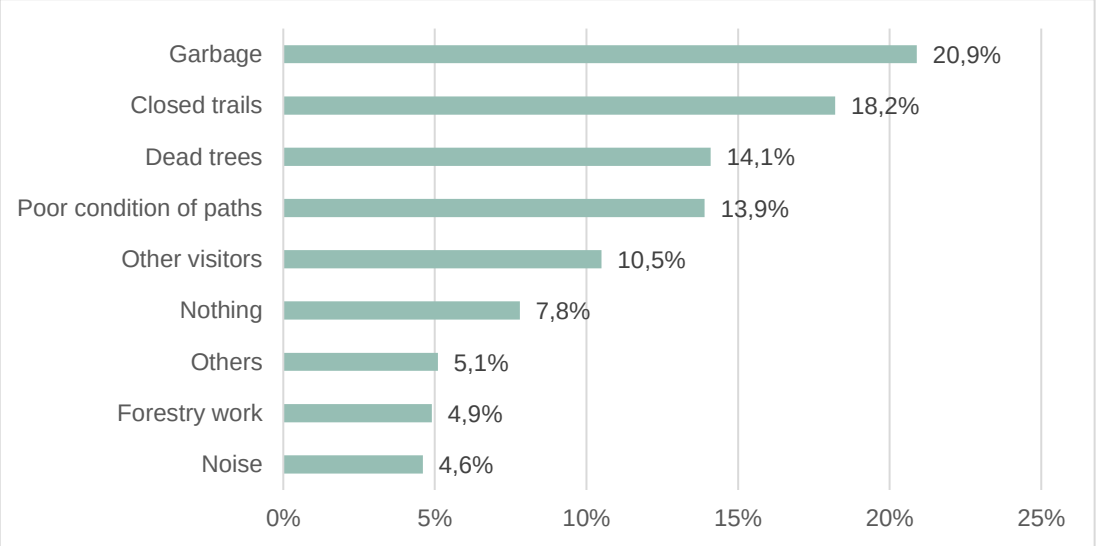
**Figure 14: Expectations for a good National Park[97]**




[97] Own survey (N=212), multiple answers possible

According to half of the respondents, the Saxon Switzerland National Park meets their expectations. However, 40.1 per cent say the national park only partially meets these, and 8.2 per cent state it does not (see Appendix 2.1.6). The question about disturbances during the national park visit shows that besides garbage (20.6 %), the respondents felt most disturbed by closed paths (17.7 %) and dead trees (14.1 %). However, 7.8 per cent said nothing bothered them during their last visit (see Figure 15). Within the open entries, three people even emphasised that they felt disturbed by some visitors disregarding the regulations of the national parks (see Appendix 2.3.3).

**Figure 15: Disturbances during the last Visit[98]**



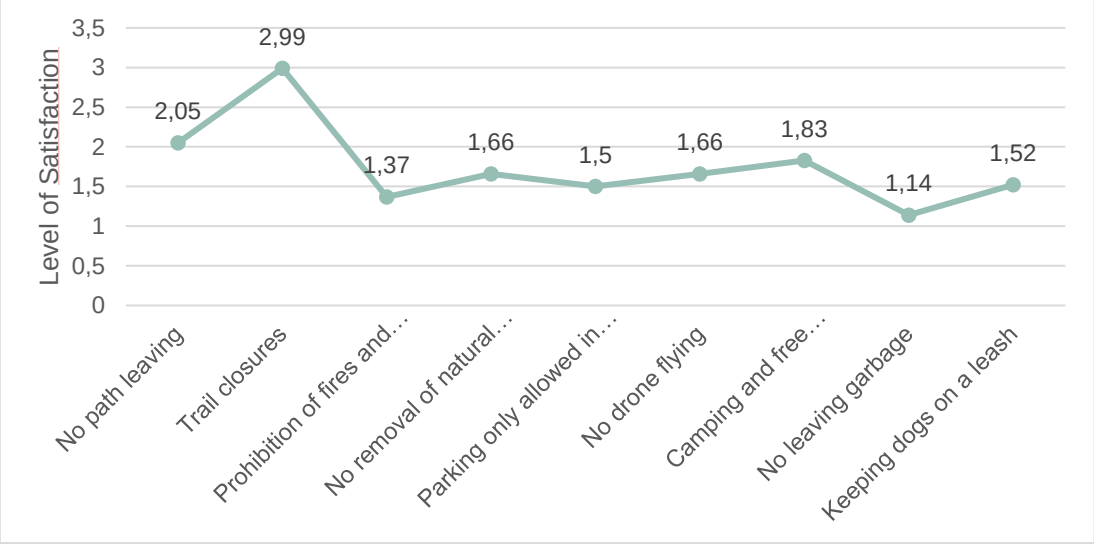

At the same time, respondents are concerned about forest damage. After excluding three cases because “I do not know” was selected, more than half of the respondents consider the current forest damage to be at least rather worrying or very worrying. This is illustrated again by the mean value, which is 3.68 and thus in the “rather worrying” category (see Appendix 2.1.8). However, statistical analysis showed that there is only a weak positive correlation between visit frequency and assessment of forest damages with a Pearson

[98] Own survey (N=212), multiple answers possible

correlation coefficient of 0.105.[99] Thus, it can be noted that the frequency of the visit does not increase linearly with the rising concern about forest damage. However, the p-value of 0.134 indicates that the correlation is not statistically significant at the conventional level of 0.05.[100] Therefore, it cannot be eliminated that the result was only achieved by chance (see Appendix 2.4.1).

About 38.6 per cent of respondents consider the work of the National Park Administration satisfactory. However, the share of only partially satisfied respondents is the second largest at 27.7 per cent. In addition, 12.4 and over 10 per cent say they are dissatisfied and not satisfied at all. This results in a mean value of 2.81, which illustrates that the answer moves around the answer “Partly” (see Appendix 2.1.9). From this, it can be seen that the respondents clearly hold opposing views. Looking more closely at opinions on regulations to protect nature, participants rate most as positive. Only the rules not to leave the paths and enter closed routes caused partial understanding (see Figure 16).

**Figure 16: Mean Value for Satisfaction regarding Regulations[101]**

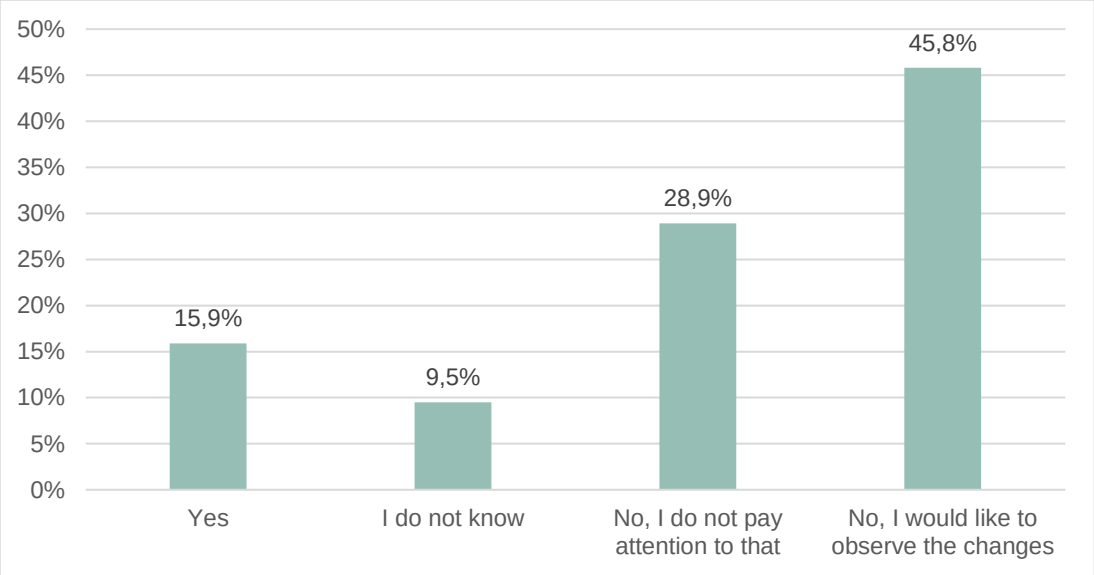



[99] cf. Raithel 2008, 152
[100] cf. Raithel 2008, 122
[101] Own survey (N=212), 1=Very satisfied 2=Satisfied 3=Partly 4=Dissatisfied 5=Not satisfied

## 6.3 Behavioural Intentions

This chapter addresses possible future behavioural tendencies. Nearly half of the respondents say they will not avoid forest damage and explicitly select routes to observe changes. While 15.9 per cent state they try to avoid forest damage when choosing a route, nearly a third say they do not pay attention to it. Almost ten per cent are still unsure how they proceed (see Figure 17).

**Figure 17: Route Selection[102]**



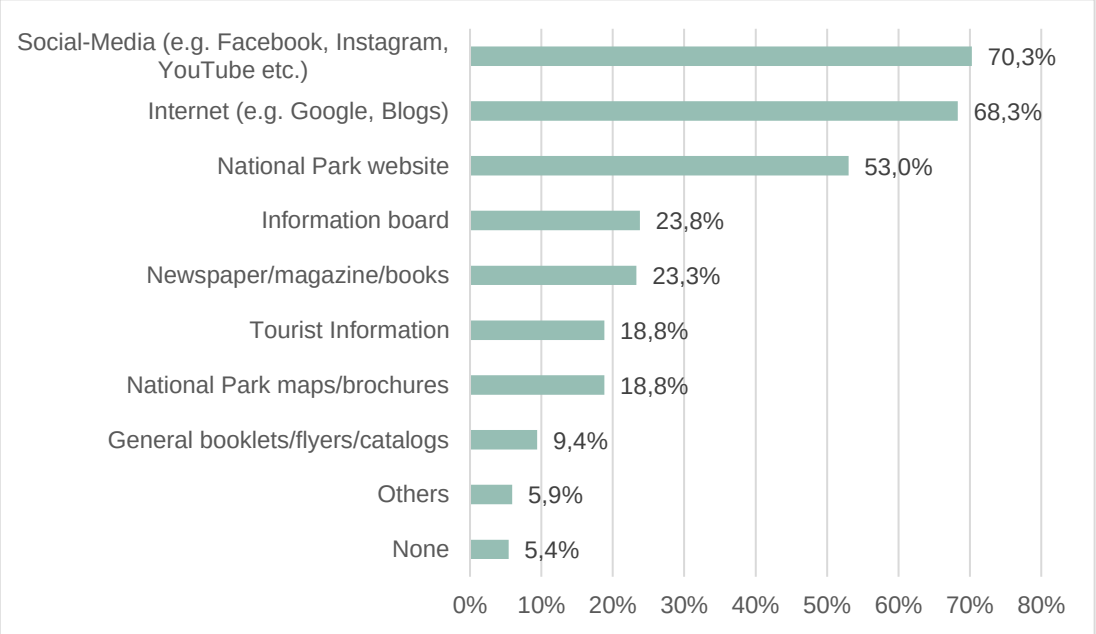

However, this result does not deter respondents from visiting the national park in the future. Almost all of them state they will most likely return. Only nine participants are unsure or do not wish to return (see Appendix 2.1.12). Because only eight people responded, the results of whether forest damage was the cause of uncertainty or the decision not to return are not particularly informative. Four people have indicated that the forest damage is the reason for their opinion. While one person was still unsure, the other three reported that their decision had another reason (see Appendix 2.1.13).

[102] Own survey (N=201)

## 6.4 Informational Intentions

This chapter evaluates the respondents' informational intentions to understand their information behaviour better and derive recommendations for the National Park Administration. Results show that most participants (39.6 %) consider their knowledge level good, whilst 26.9 per cent rate it as average and 25.4 per cent as poor. The mean value is 2.8, indicating a medium level of knowledge among the respondents (see Appendix 2.1.14). To get information, respondents use the channels depicted in Figure 18. Hereby, they utilise most often social media, the internet and the national park website.

**Figure 18: Information Channels[103]**




In terms of the number of information channels utilised, the participants use most often three with 32.0 per cent. This is followed by two (23.2 %) and four (16.7 %) channels. Finally, usage continues to decline after three channels (see Appendix 2.1.15.2). When this is put in relation to the knowledge level, the chi-square quotient gives a value of 52.027[a]. Because the p-value is smaller than 0.05, a significant relationship between the two variables is

[103] Own survey (N=203), multiple answers possible

evident. How strong and in which direction it moves cannot be read with the chi-square quotient alone, which is why other measures must be considered.[104] As the cross-tabulation is larger than 2x2, Phi is ineffective as a correlation measure.[105] Both the CramerV (0.257) and the contingency coefficient (0.457) indicate a moderate relationship between the variables. In comparison, CramerV still shows a weaker correlation. However, CramerV is independent of the expression of the variables, which is why the lower correlation is assumed.[106] From this, it can be deduced that to a small extent, better-informed respondents use more sources (see Appendix 2.4.2). In addition, 71.4 per cent would like more information from the national park regarding changes in the forest (see Appendix 2.1.16). Hereby, it can be seen that regardless of knowledge level, the desire for more information is present (see Appendix 2.4.3).

[104] cf. Raithel 2008, 137
[105] cf. Raithel 2008, 142
[106] cf. Raithel 2008, 142

# 7 Discussion and Recommendation

This chapter summarises and interprets the findings, followed by an examination of the hypotheses. Before highlighting the limitations of the study, the recommendations derived from the findings are presented.

## 7.1 Summary of Findings

The survey highlights the significance of active tourism across various social groups, with representation from different age groups and genders. Especially Dresden is a significant source market. This confirms the importance of active and nature tourism as a counterbalance to urban life.[107] However, the proportion of visitors from Saxony is higher than in the Analyse & Transfer UG study.[108] Presumably, this is due to the fact that people from the region often use these distribution channels. This suggests that the share of visitors from other German states is larger, which may explain the high number of repeat visitors. Since the survey was primarily distributed through German channels, the relatively low share of international visitors (2.1 %) is reasonable. Furthermore, the high ranking of hiking as a popular main activity emphasises the activity's importance for the region. Additionally, the second and third ranked activities “Experience Nature” and “Enjoy view” may indicate the connection between active and nature tourism.

Moving on, this paragraph addresses the respondents' attitudes towards their expectations and disturbances. In other studies, the respondents place a stronger value on the age and size of trees with a preference for larger trees.[109] As the respondents in this study do not place a high value on this aspect, one might infer that the region has an advantage over other national parks. Unlike the National Park Harz, the Saxon Switzerland National Park is better known for its distinctive rock formations than its spruce forests, which threaten to die off. Additionally, not everyone agrees with letting nature be nature, given that

[107] cf. Bauhus et al. 2021, 113
[108] cf. Analyse & Transfer UG 2017, 17
[109] cf. Edwards et al. 2012, 7, Bauhus et al. 2021, 45

"allowing natural forest development" was not chosen as frequently as other answers. For instance, respondents mentioned leaving deadwood in the forest repeatedly as a disturbance (14.1 %), which is considered a component of natural development.[110] Furthermore, a study by Arnberger et al. supports the finding that dead wood reduces the aesthetic appeal of the forest for many visitors.[111] Thereby, 636 visitors were surveyed in several forest recreation areas in the United States and Germany regarding their preferences for visual changes brought on by bark beetle outbreaks.[112] Moreover, this thesis' survey confirmed some of the negative effects on the region's aesthetic appeal already mentioned in Chapter 4.2 (p.20ff.), as many respondents felt bothered by closed or damaged trails due to, for example, storms, bark beetle or forest fires.

Furthermore, social factors are also gaining attention for their negative influence on the national park experience. For instance, the respondents' second most frequent expectation of a good national park is "quietness". However, this cannot be guaranteed in the Saxon Switzerland National Park as high visitor flows are a common occurrence. This was evident again in the question on disturbances, where some indicated that they considered other visitors as a disturbance (10.5 %) during their previous visit. Hereby, conflict potential arises from non-compliance with the national park's regulations by others, as reported in the open responses (see Appendix 2.3.3). These findings match a study by Bakhtiari et al., which proved that conflicts among forest visitors influence the quality of stay.[113] Thus, forest disturbances can sometimes lead to social conflicts in addition to influencing respondents' perceptions of the environmental appearance. Besides the forest disturbances, the cleanliness of the terrain was frequently chosen (10.6 %), indicating that garbage is another aspect that may prevent the park from fully meeting visitors' expectations. Therefore, the mentioned items are likely a reason why some respondents indicated

[110] cf. Nationalpark Sächsische Schweiz 2019, 15
[111] cf. Arnberger et al. 2018, 218
[112] cf. Arnberger et al. 2018, 212ff.
[113] cf. Bakhtiari, Jacobsen, and Jensen 2014, 668

that the Saxon Switzerland National Park only partially (51,7 %) or not at all (8,2 %) met their expectations.

Moving on, the positive Pearson correlation (0.105) shows that the frequency of visits has little influence on the perception of forest damage, despite an on-site study at the Bavarian Forest National Park indicating otherwise. Here it was found that visitors can become accustomed to deadwood areas over time.[114] However, this result can be viewed critically since an increase in the visitors' knowledge could also have led to this outcome. Moreover, a study by Müller et al. supports the findings of this thesis. The on-site study in the Bavarian Forest National Park, which consisted of 608 valid questionnaires, found no connection between frequent visits and respondents' attitudes regarding bark beetle damage.[115] It can be assumed that unfavourable perceptions will not change over time. Therefore, concrete measures are needed to gain acceptance among tourists.

Even though most respondents are rather satisfied with the work of the Saxon Switzerland National Park and thus support the measures presented in Chapter 3.2 (p. 14), a sizable portion of the sample only partially complies with this viewpoint. The results regarding regulations reveal that some respondents are critical of the rules on path abandonment and route closure. Besides that, the issue of dead wood is noteworthy. This is in line with a study by Edwards et al. that has concluded that a low level of intervention is acceptable for many visitors. However, some steps toward clean-up, such as clearing away the dead wood, are often desired.[116]

Although this thesis found that respondents would continue to visit the national park, there are conflicting findings from other researchers on the matter. For instance, a case study in Portugal revealed that increasing fire areas resulted

[114] cf. Suda 2003, 30
[115] cf. Müller and Job 2009, 381
[116] cf. Edwards et al. 2012, 8

in a decline in tourism numbers in the following periods.[117] Despite not being reflected in the thesis' findings, this phenomenon was also visible in Saxon Switzerland in the summer and fall of 2022. (see Chapter 4 p. 21). Possible explanations could be that the fire area with 150 hectares was not yet large enough for a long-term impact or that tourists may have forgotten about the issue over time. Other studies observed different results regarding the response to bark beetles. Regardless of the positive or negative opinions on the bark beetle in the past, tourism numbers in the Bavarian National Park have not decreased.[118] However, it should be remembered that the Saxon Switzerland National Park's damage from the bark beetle had no significant effects until 2018. Hence, it is possible that the effects may still change in the future. Although this thesis contends that, while forest disturbances will probably not reduce visitor numbers, they do influence route selection to some extent. Around 15 per cent of respondents expressly avoid routes with forest damage, indicating dissatisfaction with the forest image there. This attitude is counterbalanced by visitors interested in observing changes (45.8 %).

Furthermore, this study also examined the level of information among visitors since previous research has shown a correlation between an increased level of information and better acceptance of forestry practices as well as landscape changes.[119] The prevalence of internet sources can be attributed to society's increasing reliance on the internet as a reference.[120] On the other hand, the online availability of the survey indicates that it was conducted among an internet-savvy group. The internet, social media, and the national park website were the most frequently mentioned channels for informing visitors about impending changes, making them ideal platforms for communication. In addition, the overwhelming desire for more information occurred regardless of knowledge level. This suggests that both well-informed and less well-informed respondents are curious to learn more about the subject. Also, this further aids

[117] cf. Otrachshenko and Nunes 2022, 98
[118] cf. Müller, Mayer, and Job 2008, 110
[119] cf. McFarlane, Stumpf-Allen, and Watson 2006, 346; Arnberger et al. 2018, 219f.
[120] cf. IfD Allensbach 2022, 107

the purpose of a national park to provide educational activities. Based on the CramerV results (0.257) for knowledge level and the number of channels used, visitors with a higher knowledge level are more likely to seek information from multiple sources. One might also suspect that respondents use multiple sources since they are more interested in the topic. Therefore, providing information through multiple channels is critical to educate visitors effectively.

To summarise, forest disturbances will not result in a decrease in tourist numbers for the time being. Nonetheless, it is evident that rising concerns and conflicting opinions about how to address the issue are increasingly influencing visitors' experiences. Furthermore, it can be assumed that more informational guidance will be required to prevent future conflicts and dissatisfaction.

## 7.2 Hypothesis Testing

The following hypotheses are tested using the results and statistical analyses.

**H1: The current forest condition does not meet the expectations of most respondents.**

The hypothesis that the national park does not meet visitors' expectations cannot be supported, as only 8.2 per cent of respondents reported that the park did not meet their expectations. Despite the park only partially meeting the expectations of more than half of the population, 40.1 per cent of expectations were still met. This proportion is too high to verify the hypothesis. The reasons for this can be partly attributed to forest disturbances such as deadwood and other disturbance factors such as social conflicts.

**H2: Most respondents, who have frequently visited the national park, consider the forest damage to be of great concern.**

On the one hand, the hypothesis cannot be confirmed due to the low correlation, and on the other hand, the insufficient variance may also mean that the result only arose by chance. Therefore, it can be assumed for the time being

that the concern occurs regardless of how often people visit. Still, it is possible that the outcome could be different with more first-time or infrequent visitors.

**H3: The majority of respondents perceive the changes caused by forest disturbances in the national park as negative.**

Question eight can be used to verify this hypothesis, as nearly 60 per cent of respondents said that forest damages in the national park are either worrying or very worrying.

**H4: The majority of respondents who feel well-informed obtain information from multiple sources.**

The positive correlation between the two variables supports this hypothesis, implying that a greater number of sources used is associated with a higher knowledge level. However, because this analysis was conducted using subjectively assessed knowledge levels, future research could be carried out to determine whether subjective knowledge truly corresponds to actual knowledge. At the same time, the correlation between the two variables is not particularly strong. The reason for this could be that the level of knowledge is still influenced by other variables.

**H5: The attitude towards regulations regarding forest disturbances by the national park is mostly negative.**

This hypothesis must be falsified because most respondents tend to consider the work of the National Park Administration as positive, with a mean value of 2.81. In addition, the regulations are also mostly rated as positive. The survey should be repeated with more first-time visitors as this may result from the fact that many respondents have already visited the national park and are more familiar with and educated about the regulations.

**H6: The Saxon Switzerland National Park will face a decrease in visitors in the future.**

Some of the previous hypotheses could not be confirmed. Therefore, it cannot be assumed that the Saxon Switzerland National Park will experience a loss of visitors in the near future. This statement is strengthened by the fact that almost all participants indicated they would probably revisit the national park. However, it is important to remember that the sample consists mainly of repeat visitors. That is why surveying more first-time visitors might yield different results.

## 7.3 Recommendation

Although no reduction in the number of visitors is expected based on this study, steps must be taken to prevent this from happening in the future. Therefore, based on this thesis, recommendations for national park management will be derived. Central elements are information and communication-related approaches in the form of the content and development of suitable communication channels. Although the Saxon Switzerland National Park Administration has already taken steps to provide information on current forest change issues, an expansion of this service seems appropriate in light of this thesis and other studies. Especially since many respondents would like more information and show interest in the topic, it is advisable to address regulations in the national park repeatedly. In this way, they are more easily internalised and accepted.[121] Of particular importance are the rules of not leaving the path and staying off closed paths, which received the lowest level of approval in the study. Similarly, forest changes could be presented more, including the national park's response to forest disturbances. An emphasis could be on viewing the development in the region as wilderness to foster acceptance.[122] For example, dead wood left in the forest is then considered as part of the wilderness and the natural forest development. The Saxon Switzerland National Park already

[121] cf. McFarlane, Stumpf-Allen, and Watson 2006, 346
[122] cf. Müller and Imhof 2019, 324

attempted this in the form of a so-called "path to the wilderness". This 250-meter-long information trail lets visitors see how a spruce forest devastated by storms and bark beetles regenerated in just 15 years.[123] Such measures should be promoted even more strongly, and phrases like "wilderness" and "letting nature be nature" could be used more frequently in communication measures. Thus, wilderness could become more important in visitors' expectations of a national park than it was in this study due to a stronger emotional connection. Namely, as the participants express their concerns about the forest quite emotionally, communication should include both factual and emotional levels to effectively engage visitors and meet their expectations of a national park.

In terms of information distribution, the most frequently used channels (internet, social media, national park website) are a good option to inform visitors before or after their visit. Additional channel connectives are useful so that visitors interested in the topic can easily reach multiple sources. For instance, the National Park Administration frequently shares content on Facebook that is not available on the website, which is why a prominent link here would be beneficial. Furthermore, existing offers like the National Park Saxon Switzerland SandsteinSchweizer newsletter should be presented more prominently to reach a wider audience. Additionally, one way to provide more recent information about the state of the forests can be with an FAQ page on the website, similar to what the National Park Saxon Switzerland already does. This page can further cover topics such as the forest condition or bark beetle, along with links to additional information. Moreover, the rules should be displayed and explained so that everyone can see them. Nevertheless, other on-site channels like information boards should continue to be used and expanded as they reach the visitor where the issue occurs. In summary, the recommendations for national park management include providing increased information and

[123] cf. Tourismusverband Sächsische Schweiz e.V., n.d.

utilising a variety of channels to enhance knowledge and generate acceptance among visitors.

## 7.4 Limitations

Although the study provided some insights into the travel behaviour of active tourists in the national park, it was also subject to some limitations. As previously stated, this study does not claim to be representative. The initial expectations of the response were higher due to the large number of members in the Facebook groups. Unfortunately, subsequent requests to increase participation through the Bad Schandauer Kur- und Tourismus GmbH and the Saxon Switzerland National Park Administration remained unanswered. Furthermore, the survey primarily reached repeat visitors, who often came from Saxony. To ensure that the same results are obtained, future studies could investigate the effects of forest disturbances on first-time visitors more intensively. For this reason, and because a quantitative questionnaire combined with an online survey allows little room for follow-up questions, an on-site survey could further investigate the study topic. Additionally, it was not possible within the scope of this bachelor's thesis to conduct multiple surveys at different times to see if opinions and behaviour vary with the seasons or right after a forest disturbance. Similar research could be pursued moving forward. Moreover, the subjectively assessed knowledge level may deviate from the actual knowledge level. Therefore, future studies could pose specific questions to test this knowledge and determine the level of objective knowledge. Overall, additional future research is required to generalise and provide representative support for the current findings. Further research could determine whether opinions differ based on the main tourist activities they engage in and whether some forest disturbances are viewed more positively compared to others. With the help of this information, communication could be adapted to the respective target group as well as attitudes towards forest disturbance.

# 8 Conclusion

This bachelor thesis aimed to use a quantitative study to identify new insights into the travel behaviour and opinions of active tourists in the Saxon Switzerland National Park and to derive recommendations for national park management. In the course of addressing the initial research questions, the current bachelor's thesis comes to a conclusion.

**Q1: How do the perceived forest disturbances affect the travel behaviour of active tourists in the Saxon Switzerland National Park?**

The findings show that discussed forest disturbances in the Saxon Switzerland National Park barely affect the intentions of active tourists to travel there again. Despite the high level of concern regarding the forest damage, the desire to return to the national park is mostly unaffected. However, it should be noted that forest disturbances can impact what routes the visitors choose. Some prioritise observing the changes, and others choose routes where the damage is not apparent. Increasing forest damage could bring negative impacts to specific routes. Therefore, regarding route selection, forest disturbances have varying effects on the travel behaviour of active tourists.

**Q2: What are the opinions of active tourists towards forest disturbances?**

The damage to the forest brought on by disturbances in the national park is a concern for the majority of the respondents. At the same time, the environmental and social consequences of the disturbances also interfere with the quality of their visit. Thus, it can be concluded that many visitors are aware of the issue and notice it when visiting the national park. Nevertheless, this is not accompanied by a consistently negative opinion of the national park administration and its measures. Still, one can summarise that the visitors have complex and sometimes conflicting opinions towards forest disturbances and their consequences.

**Q3: What are the implications for managing natural disturbances in National Parks?**

Because the study found that respondents do not become accustomed to forest damage over time, the importance of the measures was emphasised once more. In conclusion, providing information through multiple channels is critical for educating visitors and improving acceptance of forestry practices and landscape changes in national parks. More and better-coordinated information supports the goal of further adjusting respondents' perceptions and expectations of the forest.

Even if no decreasing tourism numbers in the National Park Saxon Switzerland are recognisable so far, the increased forest damage caused by forest disturbances remains a significant problem. Moreover, this issue is not limited to the National Park Saxon Switzerland but also affects other natural areas that depend on tourism. Due to the complexity of the subject and the range of opinions, the communication process requires high capacities and additional focus. Without a national park’s focused communication strategy, it will be difficult to reconcile the opposing viewpoints. How to respond best can only be determined through further research that examines the attitudes and behaviours of the visitors and contributes to better understanding. So that, in the end, a coexistence between tourism and nature preservation can be achieved.

# Appendix

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# Appendix 1: Questionnaire

## Appendix 1.1: Questionnaire in German

### Introduction

### Page 1

Sehr geehrte Teilnehmerin, sehr geehrter Teilnehmer,

Für meine Bachelorarbeit im Studiengang „International Tourism Studies" an der Hochschule Harz untersuche ich die Auswirkungen von Waldschäden auf das Reiseverhalten der Besucher:innen des Nationalpark Sächsische Schweiz. Daher möchte ich Sie, als Besucher:in des Nationalparks bitten, mich mit dieser Befragung zu unterstützen. Die Bearbeitungszeit beträgt ca. 5-10 Minuten.

Sämtliche Daten werden in anonymisierter Form erhoben und gespeichert. Die Ergebnisse werden in aggregierter Form dargestellt, wodurch Rückschlüsse auf individuelle Angaben nicht möglich sind.

Vielen Dank für Ihre Bereitschaft, an der Umfrage teilzunehmen.

Laura König

Für inhaltliche Rückfragen zu dieser Online-Befragung können Sie sich an mich (Mail: u35340@hs-harz.de) wenden.

### Visit National Park Saxon Switzerland

### Page 2

**1. Wie häufig waren Sie bereits im Nationalpark Sächsische Schweiz?**

- ○ 1-2
- ○ 3-4
- ○ 5-6
- ○ 7-8
- ○ 9 oder mehr
- ○ Ich war noch nie im Nationalpark Sächsische Schweiz

## Page 3

**2. Wie regelmäßig besuchen Sie den Nationalpark Sächsische Schweiz?**

- ○ Mehrmals pro Woche
- ○ Einmal pro Woche
- ○ Mehrmals pro Monat
- ○ Einmal pro Monat
- ○ Mehrmals pro Jahr
- ○ Einmal pro Jahr
- ○ Seltener

**3. Was sind Ihre Hauptaktivitäten beim Besuch des Nationalparks Sächsische Schweiz?**
Bitte ordnen Sie die auf Ihren Besuch zutreffenden Aktivitäten nach ihrer Häufigkeit an.

| | | | |
|---|---|---|---|
| Wandern | Rad fahren | Mountainbiken | 1 |
| Klettern | Fotografieren/Filmen | Hund ausführen | 2 |
| Natur erleben | Ausblick genießen | Im Freien Übernachten (Boofen) | 3 |
| | | | 4 |
| | | | 5 |
| | | | 6 |
| | | | 7 |
| | | | 8 |
| | | | 9 |
| | | | 10 |

**4. Ihr letzter Besuch im Nationalpark Sächsische Schweiz fand statt im Rahmen**

- ○ eines Tagesausflugs.
- ○ einer Kurzreise (bis 3 Tage).
- ○ eines Urlaubs (4 Tage oder mehr).

## Preferences on National Park

## Page 4

**5. Was erwarten Sie von einem guten Nationalpark?**
(Mehrfachnennungen möglich)

- [ ] Intakte Natur
- [ ] Alte/große Bäume
- [ ] Gute Sichtbarkeit der Besuchsregeln
- [ ] Sauberkeit im Gelände
- [ ] Zulassen der natürlichen Waldentwicklung
- [ ] Wildnis-Charakter
- [ ] Verhinderung der touristischen Überlastung
- [ ] Natürliche Wege
- [ ] Ruhe
- [ ] Informationstafeln
- [ ] Vielfältige Tier- und Pflanzenwelt
- [ ] Bänke und Rastplätze
- [ ] Sonstiges, und zwar: _____

**6. Erfüllt der Nationalpark Sächsische Schweiz diese Erwartungen?**

( ) Ja ( ) Teils/teils ( ) Nein

**7. Was hat Sie bei Ihrem letzten Besuch besonders gestört?**
(Mehrfachnennungen möglich)

- [ ] Abgestorbene Bäume
- [ ] Schlechter Wegezustand
- [ ] Müll
- [ ] Andere Besucher:innen
- [ ] Wegesperrungen
- [ ] Forstarbeiten
- [ ] Lärm
- [ ] Nichts
- [ ] Sonstiges, und zwar: _____

**8. Wie bedenklich finden Sie die Waldschäden im Nationalpark Sächsische Schweiz?**

| Sehr unbedenklich | Eher unbedenklich | Teils/teils | Eher bedenklich | Sehr bedenklich | Weiß ich nicht |
|---|---|---|---|---|---|
| ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |

## Page 5

**9. Wie zufrieden sind Sie mit der Arbeit des Nationalparks Sächsische Schweiz bezüglich des Naturschutzes und der Waldpflege?**

| Sehr zufrieden | Zufrieden | Teils/teils | Unzufrieden | Nicht zufrieden | Weiß ich nicht |
|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ |

**10. Wie bewerten Sie die geltenden Verhaltensregeln zum Schutz der Natur des Nationalparks für die Besucher:innen?**

| | Sehr positiv | Positiv | Teils/ teils | Negativ | Sehr negativ |
|---|---|---|---|---|---|
| Kein Verlassen der Wege | ○ | ○ | ○ | ○ | ○ |
| Wegesperrungen | ○ | ○ | ○ | ○ | ○ |
| Verbot von Feuern und Rauchen | ○ | ○ | ○ | ○ | ○ |
| Kein Entfernen natürlicher Ressourcen (z.B. Tiere, Pflanzen, Steine) | ○ | ○ | ○ | ○ | ○ |
| Parken nur auf Parkplätzen erlaubt | ○ | ○ | ○ | ○ | ○ |
| Keine Drohnen fliegen lassen | ○ | ○ | ○ | ○ | ○ |
| Campen und Freiübernachten zu bestimmten Zeiten verboten | ○ | ○ | ○ | ○ | ○ |
| Keinen Müll hinterlassen | ○ | ○ | ○ | ○ | ○ |
| Hunde an der Leine führen | ○ | ○ | ○ | ○ | ○ |

## Behavioural Intentions

## Page 6

**11. Werden Sie zukünftig bei Ihrer Routenauswahl Wege mit Waldschäden meiden?**

- ○ Ja
- ○ Weiß ich nicht
- ○ Nein, darauf achte ich nicht
- ○ Nein, ich möchte die Veränderungen beobachten

**12. Werden Sie den Nationalpark Sächsische Schweiz zukünftig wahrscheinlich wieder besuchen?**

| Ja | Weiß ich nicht | Nein |
|---|---|---|
| ○ | ○ | ○ |

**Page 7** *[Show only if "No" or "I do not know" is selected for question 12]*

**13. Sind die Waldschäden oder die davon ausgehende Gefahr der Grund dafür, dass Sie den Nationalpark Sächsische Schweiz nicht besuchen wollen oder sich noch unsicher sind?**

- ○ Ja
- ○ Nein
- ○ Keine Angabe

## Information behaviour

## Page 8

**14. Wie gut fühlen Sie sich über derzeitigen Veränderungen im Wald informiert?**

| ○ | ○ | ○ | ○ | ○ |
|---|---|---|---|---|
| Sehr gut | Gut | Nicht schlecht | Schlecht | Sehr schlecht |

**15. Und welche der folgenden Medien bzw. Kanäle haben Sie genutzt, um sich darüber zu informieren?**
(Mehrfachnennungen möglich)

- ☐ Internet (z.B. Google, Blogs)
- ☐ Internetseite des Nationalparks
- ☐ Social-Media (z.B. Facebook, Instagram, YouTube etc.)
- ☐ Zeitung/Zeitschrift/Bücher
- ☐ Karten/Broschüren des Nationalparks
- ☐ Allgemeine Broschüren/Flyer/Kataloge
- ☐ Tourist Information
- ☐ Informationstafel
- ☐ Gar nicht
- ☐ Sonstiges, und zwar: _____

**16. Wünschen Sie sich mehr Informationen vom Nationalpark Sächsische Schweiz zu den Veränderungen im Wald?**

- ○ Ja
- ○ Nein

## Sociodemographic Characteristics

## Page 9

**17. Wie alt sind Sie?**

[Bitte auswählen]

**18. Welchem Geschlecht ordnen Sie sich zu?**

- ○ Weiblich
- ○ Männlich
- ○ Divers
- ○ Keine Angabe

**19. Wie lautet die PLZ Ihres Wohnortes?**
**Falls Sie aus dem Ausland kommen, aus welchem Land kommen Sie?**

Postleitzahl:

Land:

**20. Was ist Ihr höchster Schulabschluss?**

- ○ (noch) kein Abschluss
- ○ Hauptschulabschluss
- ○ Realschulabschluss/Mittlere Reife
- ○ Allgemeine Hochschulreife/Fachhochschulreife/fachgebundene Hochschulreife/Matura
- ○ (Fach-)Hochschulabschluss
- ○ Promotion
- ○ Keine Angabe
- ○ Sonstiges, und zwar:

## Appendix 1.2: Questionnaire in English

### Introduction

**Page 1**

Dear participants,

For my bachelor's thesis in the degree "International Tourism Studies" at the Harz University of Applied Sciences, I am examining the effects of forest damage on the travel behaviour of visitors to the Saxon Switzerland National Park. Therefore, I would like to ask you, as a visitor of the National Park, to support me with this survey. The time required to complete the survey is about 5-10 minutes.

All data will be collected and stored in an anonymous form. The results are presented in aggregated form, which means that it is not possible to draw conclusions about individual data.

Thank you for your willingness to participate in the survey.

Laura König
If you have any questions regarding this online survey, please contact me (u35340@hs-harz.de).

**Visit National Park Saxon Switzerland**

**Page 2**

1. How often have you been to the Saxon Switzerland National Park?
    - 1-2
    - 3-4
    - 5-6
    - 7-8
    - 9 or more
    - I have never been to the Saxon Switzerland National Park *[Cancellation Survey]*

**Page 3**

2. How regularly do you visit the Saxon Switzerland National Park?
    - Several times per week
    - Once a week
    - Several times per month
    - Once a month
    - Several times per year
    - Once a year
    - Rarely
3. What is your main activity when visiting Saxon Switzerland National Park?
    - Hiking
    - Cycling
    - Mountain biking
    - Climbing
    - Photography/filming
    - Dog walking
    - Experience nature
    - Enjoy the view

- □ Overnight stay in the nature (Boofen)
- □ I do not know
- □ Others, namely: _____ *[open text]*

4. Your last visit to the National Park Saxon Switzerland took place in the context of:
   - □ a day trip.
   - □ a short trip (up to 3 days).
   - □ a vacation (4 days or more).

**Preferences on National Park**

**Page 4**

5. What do you expect of a good National Park?
   *[multiple answers possible]*
   - □ Old/great trees
   - □ Diverse flora and fauna
   - □ Quietness
   - □ Wilderness character
   - □ Natural paths
   - □ Good visibility of visiting rules
   - □ Information boards
   - □ Benches and rest areas
   - □ Cleanliness of the terrain
   - □ Allowing natural forest development
   - □ Prevention of tourist crowding
   - □ Intact nature
   - □ Others, namely: _____ *[open text]*
6. Does the Saxon Switzerland National Park meet these expectations?
   - □ Yes
   - □ Partly

- ☐ No

7. What particularly bothered you during your last visit?
   *[multiple answers possible]*
   - ☐ Forestry work
   - ☐ Garbage
   - ☐ Other visitors
   - ☐ Dead trees
   - ☐ Poor condition of paths
   - ☐ Closed trails
   - ☐ Noise
   - ☐ Nothing
   - ☐ Others, namely: _____ *[open text]*
8. How worrying do you find the forest damage in the Saxon Switzerland National Park?
   - ☐ Very harmless
   - ☐ Rather harmless
   - ☐ Partly
   - ☐ Rather worrying
   - ☐ Very worrying
   - ☐ I do not know

**Page 5**

9. How satisfied are you with the work of the Saxon Switzerland National Park regarding nature conservation and forest management?
   - ☐ Very satisfied
   - ☐ Satisfied
   - ☐ Partly
   - ☐ Dissatisfied
   - ☐ Not satisfied
   - ☐ I do not know

10. How would you assess the regulations enacted to safeguard the park's natural resources for visitors?

| | Very positive | | | | Very negative |
|---|---|---|---|---|---|
| No path leaving | | | | | |
| Trail closures | | | | | |
| Prohibition of fires and smoking | | | | | |
| No removal of natural resources (e.g. animals, plants, stones) | | | | | |
| Parking only allowed in parking lots | | | | | |
| No drone flying | | | | | |
| Camping and free overnighting prohibited at certain times | | | | | |
| No leaving garbage | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Keeping dogs on a leash | | | | | |

**Behavioural Intentions**

**Page 6**

11. Will you avoid trails with forest damage in your route selection in the future?
    - Yes
    - I do not know
    - No, I do not pay attention to that
    - No, I would like to observe the changes
12. Will you probably visit the Saxon Switzerland National Park again in the future?
    - Yes
    - I do not know
    - No

**Page 7** *[Show only if "No" or "I do not know" is selected for question 12]*

13. Are the forest damages or the danger they pose the reason why you do not want to visit the National Park Saxon Switzerland or are still unsure?
    - Yes
    - No
    - I do not know

**Information behaviour**

**Page 8**

14. How well do you feel informed about current changes in the forest?
    - Very good

- Good
- Average
- Poor
- Very poor

15. Which of the following media or channels did you use to find out about it? *[multiple answers possible]*
    - Internet (e.g. Google, Blogs)
    - Social-Media (e.g. Facebook, Instagram, YouTube etc.)
    - General booklets/flyers/catalogues
    - National Park maps/brochures
    - National Park website
    - Newspaper/magazine/books
    - Tourist Information
    - Information board
    - None
    - Others, namely: _____ *[open text]*
16. Would you like more information from the Saxon Switzerland National Park about changes in the forest?
    - Yes
    - No

**Sociodemographic Characteristics**

**Page 9**

17. How old are you?
    - 14 to 20
    - 21 to 30
    - 31 to 40
    - 41 to 50
    - 51 to 60

- 61 to 70
- From 71
- Not specified

18. What is your gender?
    - Female
    - Male
    - Divers
    - Not specified
19. Where are you from?
    - Postal code: _____ *[open text]*
    - Country: _____ *[open text]*
20. What is your highest level of education?
    - No degree (yet)
    - Middle school
    - Secondary school diploma
    - General university entrance qualification/university of applied sciences entrance qualification/specialised university entrance qualification/matura
    - University degree
    - Doctorate
    - Not specified
    - Others, namely: _____ *[open text]*

## Appendix 1.3: Questionnaire Design[124]

| Section | Aim | Question Content | Response type |
|---|---|---|---|
| **Introduction** | Explanation of the purpose of the survey and specification of the data anonymity as well as providing the contact details. | | |
| **National Park Visit** | Questions about travel behaviour provide an easy entry and characterise the preferences of the respondents and their impact on the visit experience | Visit Frequency | 5 Response Options (RO), Closed |
| | | Visit Regularity | 7 RO, Closed |
| | | Activities | Ranking, Semi-closed with 10 RO and open text “Others” |
| | | Trip Type | 3 RO, Closed |
| **Preferences on National Park** | Identification of participants’ expectations of National Parks and if the Saxon Switzerland National Park can meet these expectations | Expectations | Multiple Choice, Semi-closed with 12 RO and open text “Others” |
| | | Fulfilment of Expectations | 3 RO, Closed |
| | Determination of perceptions of changes in the National Park due to forest disturbance and damage | Disturbances | Multiple Choice, Semi-closed with 8 RO and open text “Others” |
| | | Forest Damage | 5-Point-Rating Scale and “I do not know” |
| | Measurement of visitor’s satisfaction with National Park’s work and their regulations | Satisfaction National Park Administration | 5-Point-Rating Scale and “I do not know” |
| | | Satisfaction Regulations | 5-Point-Rating Scale |

[124] Own representation

| | | | |
|---|---|---|---|
| **Behavioural Intentions** | Description of tendencies for future behaviour and identification of objections to visiting again | Route Selection | 4 RO, Closed |
| | | Visit Probability | 3 RO, Closed |
| | | Reasons | 3 RO, Closed, only displayed if “No” or “I do not know” was selected previously |
| **Informational Behaviour** | Identification of the relationship between respondents’ information level about forest disturbances, the number of information channels, and the need for more information. | Knowledge Level | 5-Point-Rating Scale |
| | | Information Channels | Multiple Choice, Semi-closed with 12 RO and open text “Others” |
| | | Demand | Dichotomous |
| **Sociodemographic Characteristics** | Definition of sample’s characteristics | Age | 8 RO, Closed |
| | | Gender | 4 RO, Closed |
| | | Origin | Open |
| | | Highest Level of Education | Semi-closed with 7 RO and open text “Others” |

# Appendix 2: Survey Analysis

## Appendix 2.1: Basis Data Analysis

### 2.1.1: How often have you been to the Saxon Switzerland National Park? (N=212)

| Visit Frequency | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| 1 – 2 | 15 | 7.1% | 7.1% |
| 3 – 4 | 17 | 8.0% | 151% |
| 5 – 6 | 12 | 5.7% | 20.8% |
| 7 – 8 | 16 | 7.5% | 28.3% |
| 9 or more | 152 | 71.7% | 100.0% |
| Total | 212 | 100 | |

| | N | Minimum | Maximum | Mean value | Standard deviation |
|---|---|---|---|---|---|
| Visit Frequency | 212 | 1 | 5 | 4.29 | 1.287 |

### 2.1.2: How regularly do you visit the Saxon Switzerland National Park? (N=206)

| Visit Regularity | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Several times per week | 4 | 1.9% | 1.9% |
| Once a week | 5 | 2.4% | 4.4% |
| Several times per month | 26 | 12.6% | 17.0% |
| Once a month | 21 | 10.2% | 27.2% |
| Several times per year | 89 | 43.2% | 70.4% |
| Once a year | 41 | 19.9% | 90.3% |
| Rarely | 20 | 9.7% | 100.0% |
| Total | 206 | 100.0% | |

### 2.1.3: What is your main activity when visiting Saxon Switzerland National Park? (N=212)

| Main Activities | |
|---|---|
| Activities | Awarded Points |
| Hiking | 9.0 |
| Experience nature | 8.0 |
| Enjoy the view | 7.4 |
| Photography/filming | 7.0 |
| Cycling | 6.6 |
| Climbing | 6.3 |
| Dog walking | 5.9 |
| Overnight stay in the nature (Boofen) | 5.5 |
| Mountain biking | 4.9 |

### 2.1.4: Your last visit to the National Park Saxon Switzerland took place in the context of: (N=211)

| Trip Type | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| A day trip | 117 | 55.5% | 55.5% |
| A short trip (up to 3 days) | 41 | 19.4% | 74.9% |
| A vacation (4 days or more) | 53 | 25.1% | 100.0% |
| Total | 211 | 100.0 | |

### 2.1.5: What do you expect of a good National Park? (N=212)

Multiple answers possible

| Expectations | | |
|---|---|---|
| | Responses | |
| | N | Percentages |
| Old/great trees | 103 | 7.3% |
| Diverse flora and fauna | 136 | 9.6% |
| Quietness | 158 | 11.1% |
| Wilderness character | 94 | 6.6% |
| Natural paths | 167 | 11.8% |

| | | |
|---|---|---|
| Good visibility of visiting rules | 61 | 4.3% |
| Information boards | 95 | 6.7% |
| Benches and rest areas | 109 | 7.7% |
| Cleanliness of the terrain | 150 | 10.6% |
| Allowing natural forest development | 110 | 7.8% |
| Prevention of tourist crowding | 93 | 6.6% |
| Intact nature | 122 | 8.6% |
| Others | 21 | 1.5% |
| Total | 1420 | 100.0% |

### 2.1.6: Does the Saxon Switzerland National Park meet these expectations? (N=207)

| Fulfilment of Expectations | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Yes | 83 | 40.1% | 40.1% |
| Partly | 107 | 51.7% | 91.8% |
| No | 17 | 8.2% | 100.0% |
| Total | 207 | 100.0% | |

### 2.1.7: What particularly bothered you during your last visit? (N=212)

Multiple answers possible

| Disturbances | | |
|---|---|---|
| | Responses | |
| | N | Percentages |
| Forestry work | 20 | 4.9% |
| Garbage | 86 | 20.9% |
| Other visitors | 43 | 10.5% |
| Dead trees | 58 | 14.1% |
| Poor condition of paths | 57 | 13.9% |

| | | |
|---|---|---|
| Closed trails | 75 | 18.2% |
| Noise | 19 | 4.6% |
| Nothing | 32 | 7.8% |
| Others | 21 | 5.1% |
| Total | 411 | 100.0% |

### 2.1.8: How worrying do you find the forest damage in the Saxon Switzerland National Park? (N=207)

| Forest Damage | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Very harmless | 10 | 4.8% | 4.8% |
| Rather harmless | 21 | 10.1% | 15.0% |
| Partly | 52 | 25.1% | 40.1% |
| Rather worrying | 62 | 30.0% | 70.0% |
| Very worrying | 59 | 28.5% | 98.6% |
| I do not know | 3 | 1.4% | 100.0% |
| Total | 207 | 100.0% | |

| | N | Minimum | Maximum | Mean value | Standard deviation |
|---|---|---|---|---|---|
| Forest Damage | 204 | 1 | 5 | 3.68 | 1.141 |

### 2.1.9: How satisfied are you with the work of the Saxon Switzerland National Park regarding nature conservation and forest management? (N=202)

| Satisfaction National Park Administration | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Very satisfied | 14 | 6.9% | 6.9% |
| Satisfied | 78 | 38.6% | 45.5% |
| Partly | 56 | 27.7% | 73.3% |
| Dissatisfied | 25 | 12.4% | 85.6% |
| Not satisfied | 22 | 10.9% | 96.5% |
| I do not know | 7 | 3.5% | 100.0% |
| Total | 202 | 100.0% | |

| | N | Minimum | Maximum | Mean value | Standard deviation |
|---|---|---|---|---|---|
| Satisfaction National Park Administration | 195 | 1 | 5 | 2.81 | 1.112 |

## 2.1.10: How would you assess the regulations enacted to safeguard the park's natural resources for visitors?

### 2.1.10.1: Overview of Satisfaction Regulations

| Satisfaction Regulations | | | | | |
|---|---|---|---|---|---|
| | N | Minimum | Maximum | Mean value | Standard deviation |
| No path leaving | 199 | 1 | 5 | 2.05 | 1.034 |
| Trail closures | 195 | 1 | 5 | 2.99 | 1.216 |
| Prohibition of fires and smoking | 201 | 1 | 5 | 1.37 | 0.752 |
| No removal of natural resources (e.g. animals, plants, stones) | 199 | 1 | 4 | 1.66 | 0.873 |
| Parking only allowed in parking lots | 199 | 1 | 4 | 1.5 | 0.803 |
| No drone flying | 197 | 1 | 5 | 1.66 | 0.921 |
| Camping and free overnighting prohibited at certain times | 199 | 1 | 5 | 1.83 | 1.006 |
| No leaving garbage | 200 | 1 | 4 | 1.14 | 0.492 |
| Keeping dogs on a leash | 200 | 1 | 5 | 1.52 | 0.891 |

### 2.1.10.2: Individual Presentation of the Regulations

| No path leaving | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Very positive | 72 | 36.2% | 36.2% |
| Positive | 69 | 34.7% | 70.9% |
| Partly | 39 | 19.6% | 90.5% |
| Negative | 14 | 7.0% | 97.5% |
| Very negative | 5 | 2.5% | 100.0% |
| Total | 199 | 100.0% | |

| Trail closures | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Very positive | 22 | 11.3% | 11.3% |
| Positive | 44 | 22.6% | 33.8% |
| Partly | 76 | 39.0% | 72.8% |
| Negative | 19 | 9.7% | 82.6% |
| Very negative | 34 | 17.4% | 100.0% |
| Total | 195 | 100.0% | |

| Prohibition of fires and smoking | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Very positive | 151 | 75.1% | 75.1% |
| Positive | 32 | 15.9% | 91.0% |
| Partly | 12 | 6.0% | 97.0% |
| Negative | 5 | 2.5% | 99.5% |
| Very negative | 1 | 0.5% | 100.0% |
| Total | 201 | 100.0% | |

| No removal of natural resources (e.g. animals, plants, stones) | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Very positive | 114 | 57.3% | 57.3% |
| Positive | 46 | 23.1% | 80.4% |
| Partly | 32 | 16.1% | 96.5% |
| Negative | 7 | 3.5% | 100.0% |
| Very negative | 0 | 0.0% | |

| | | | |
|---|---|---|---|
| Total | 199 | 100.0% | |

| Parking only allowed in parking lots | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Very positive | 130 | 65.3% | 65.3% |
| Positive | 48 | 24.1% | 89.4% |
| Partly | 12 | 6.0% | 95.5% |
| Negative | 9 | 4.5% | 100.0% |
| Very negative | 0 | 0.0% | |
| Total | 199 | 100.0% | |

| No drone flying | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Very positive | 118 | 59.9% | 59.9% |
| Positive | 37 | 18.8% | 78.7% |
| Partly | 34 | 17.3% | 95.9% |
| Negative | 7 | 3.6% | 99.5% |
| Very negative | 1 | 0.5% | 100.0% |
| Total | 197 | 100.0% | |

| Camping and free overnighting prohibited at certain times | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Very positive | 101 | 50.8% | 50.8% |
| Positive | 47 | 23.6% | 74.4% |
| Partly | 38 | 19.1% | 93.5% |
| Negative | 10 | 5.0% | 98.5% |
| Very negative | 3 | 1.5% | 100.0% |
| Total | 199 | 100.0% | |

| No leaving garbage | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Very positive | 182 | 91.0% | 91.0% |
| Positive | 10 | 5.0% | 96.0% |
| Partly | 6 | 3.0% | 99.0% |
| Negative | 2 | 1.0% | 100.0% |
| Very negative | 0 | 0.0% | |

| | | | |
|---|---|---|---|
| Total | 212 | 100.0% | |

| Keeping dogs on a leash | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Very positive | 137 | 68.5% | 68.5% |
| Positive | 33 | 16.5% | 85.0% |
| Partly | 21 | 10.5% | 99.5% |
| Negative | 7 | 3.5% | 99.0% |
| Very negative | 2 | 0.1% | 100.0% |
| Total | 200 | 100.0% | |

### 2.1.11: Will you avoid trails with forest damage in your route selection in the future? (N=201)

| Route Selection | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Yes | 32 | 15.9% | 15.9% |
| I do not know | 19 | 9.5% | 25.4% |
| No, I do not pay attention to that | 58 | 289% | 54.2% |
| No, I would like to observe the changes | 92 | 45.8% | 100.0% |
| Total | 201 | 100.0% | |

### 2.1.12: Will you probably visit the Saxon Switzerland National Park again in the future? (N=202)

| Visit Probability | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Yes | 193 | 95.5% | 95.5% |
| I do not know | 6 | 3.0% | 98.5% |
| No | 3 | 1.5% | 100.0% |
| Total | 202 | 100.0% | |

### 2.1.13: Are the forest damages or the danger they pose the reason why you do not want to visit the National Park Saxon Switzerland or are still unsure? (N=8)

| Reasons for Visit Probability | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Yes | 4 | 50.0% | 50.0% |
| No | 3 | 37.5% | 87.5% |
| I do not know | 1 | 12.5% | 100.0% |
| Total | 8 | 100.0% | |

### 2.1.14: How well do you feel informed about current changes in the forest? (N=197)

| Knowledge Level | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Very good | 11 | 5.6% | 5.6% |
| Good | 78 | 39.6% | 45.2% |
| Average | 53 | 26.9% | 72.1% |
| Poor | 50 | 25.4% | 97.5% |
| Very poor | 5 | 2.5% | 100.0% |
| Total | 197 | 100.0% | |

| | N | Minimum | Maximum | Mean value | Standard deviation |
|---|---|---|---|---|---|
| Information level | 194 | 1 | 5 | 2.8 | 0.969 |

### 2.1.15.1: Which of the following media or channels did you use to find out about it? (N=203)

Multiple answers possible

| Information Channels | | |
|---|---|---|
| | Frequency | Percentages |
| Internet (e.g. Google, Blogs) | 139 | 68.8% |
| Social-Media (e.g. Facebook, Instagram, YouTube etc.) | 142 | 70.3% |
| General booklets/flyers/catalogs | 19 | 9.4% |
| National Park maps/brochures | 38 | 18.8% |
| National Park website | 107 | 53.0% |

| | | |
|---|---|---|
| Newspaper/magazine/books | 47 | 23.3% |
| Tourist Information | 38 | 18.8% |
| Information board | 48 | 23.8% |
| None | 11 | 5.4% |
| Others | 11 | 5.4% |

### 2.1.15.2: Which of the following media or channels did you use to find out about it? (N=203)

| Number of Information Channels used | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| 0 | 2 | 1,0% | 1,0% |
| 1 | 30 | 14,8% | 15,8% |
| 2 | 47 | 23,2% | 38,9% |
| 3 | 65 | 32,0% | 70,9% |
| 4 | 34 | 16,7% | 87,7% |
| 5 | 14 | 6,9% | 94,6% |
| 6 | 5 | 2,5% | 97,0% |
| 7 | 3 | 1,5% | 98,5% |
| 8 | 3 | 1,5% | 100,0% |
| Total | 203 | 100,0% | |

### 2.1.16: Would you like more information from the Saxon Switzerland National Park about changes in the forest? (N=199)

| Demand for Information | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| Yes | 142 | 71.4% | 71.4% |
| No | 57 | 28.6% | 100.0% |
| Total | 199 | 100.0% | |

### 2.1.17: How old are you? (N=168)

| Age | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| 14 to 20 | 1 | 0.6% | 0.6% |
| 21 to 30 | 11 | 6.5% | 7.1% |
| 31 to 40 | 41 | 24.4% | 31.5% |

| | | | |
|---|---|---|---|
| 41 to 50 | 41 | 24.4% | 56.0% |
| 51 to 60 | 51 | 30.4% | 86.3% |
| 61 to 70 | 22 | 13.1% | 99.4% |
| From 71 | 1 | 0.6% | 100.0% |
| Total | 168 | 100.0% | |

## 2.1.18: What is your gender? (N=199)

| Gender | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percent-ages |
| Female | 109 | 54.8% | 54.8% |
| Male | 88 | 44.2% | 99.0% |
| Divers | 1 | 0.5% | 99.5% |
| Not specified | 1 | 0.5% | 100.0% |
| Total | 199 | 100.0% | |

## 2.1.19: Where are you from?

## 2.1.19.1: Overview of Origin (N=194)

| | Frequency | Percentages |
|---|---|---|
| Baden-Wuerttemberg | 1 | 0.5% |
| Bavaria | 4 | 2.1% |
| Berlin | 9 | 4.6% |
| Brandenburg | 10 | 4.6% |
| Bremen | 1 | 0.5% |
| Hamburg | 2 | 1.0% |
| Hesse | 1 | 0.5% |
| Lower Saxony | 17 | 8.8% |
| Mecklenburg-West Pomerania | 5 | 2.6% |
| North Rhine-Westphalia | 9 | 4.6% |
| Saxony | 111 | 57.7% |
| Saxony-Anhalt | 15 | 7.7% |
| Schleswig-Holstein | 3 | 1.5% |
| Thuringia | 2 | 1.0% |
| Foreign Countries | 4 | 2.1% |
| Total | 194 | |

## 2.1.19.2: Origin in Saxony (N=111)

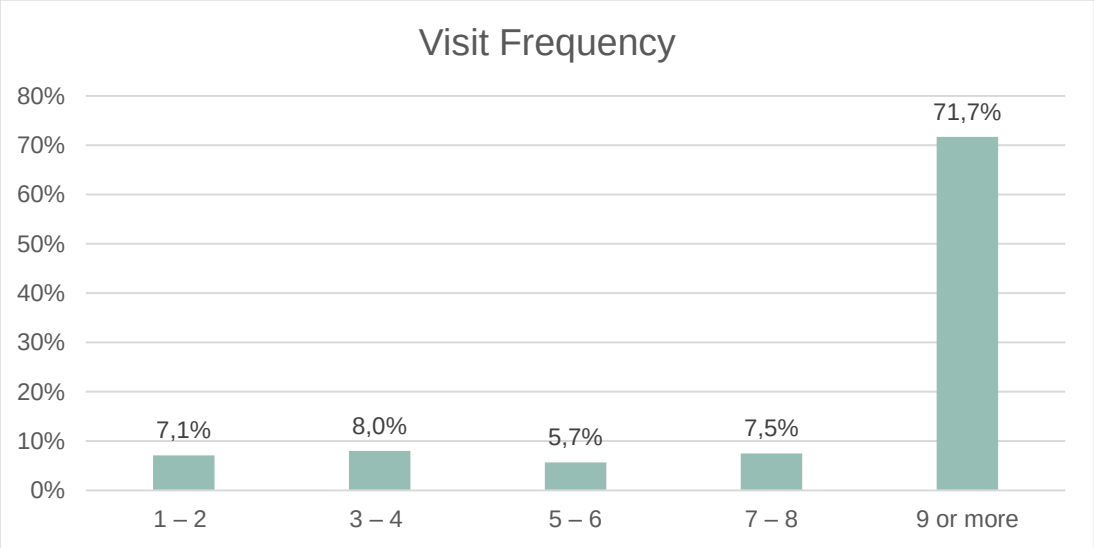
| | Frequency | Percentages |
|---|---|---|
| Bautzen | 9 | 8.1% |
| Chemnitz | 3 | 2.7% |
| Dresden | 33 | 29.7% |
| Erzgebirgskreis | 6 | 5.4% |
| Gorlitz | 3 | 2.7% |
| Leipzig | 6 | 5.4% |
| District Leipzig | 2 | 1.8% |
| Meißen | 10 | 9.0% |
| Mittelsachsen | 3 | 2.7% |
| Nordsachsen | 3 | 2.7% |
| Saxon Switzerland-Eastern Ore Mountains | 29 | 26.1% |
| Vogtlandkreis | 2 | 1.8% |
| Zwickau | 2 | 1.8% |
| Total | 111 | 100.0% |

## 2.1.20: What is your highest level of education? (N=199)

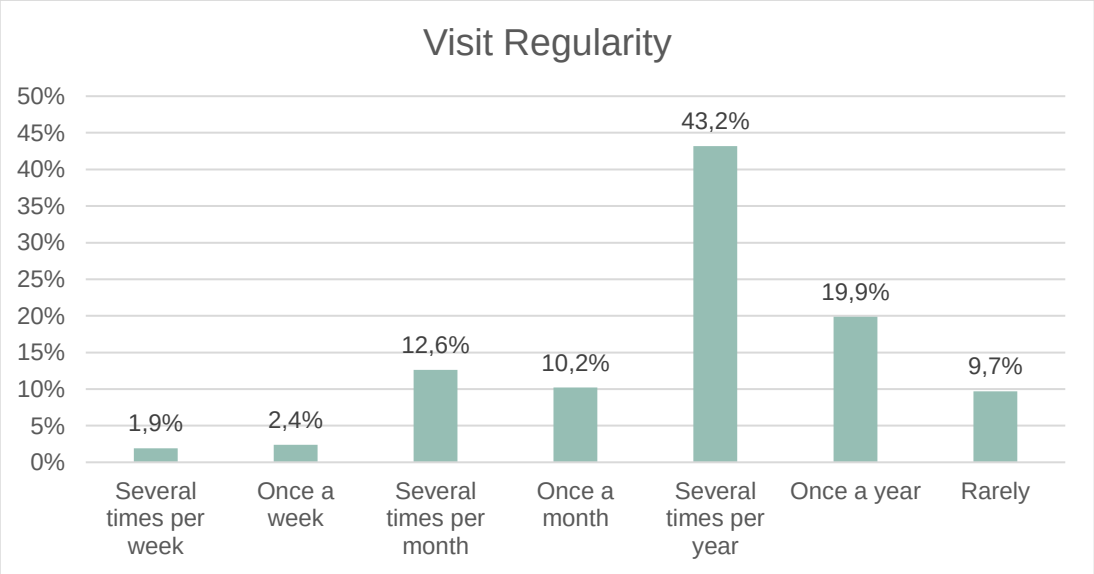
| Highest Level of Education | | | |
|---|---|---|---|
| | Frequency | Percentages | Cumulated percentages |
| No degree (yet) | 2 | 1.0% | 1.0% |
| Middle school | 6 | 3.0% | 4.0% |
| Secondary school diploma | 58 | 29.1% | 33.2% |
| General university entrance qualification/university of applied sciences entrance qualification/specialised university entrance qualification/matura | 34 | 17.1% | 50.3% |
| University degree | 85 | 42.7% | 93.0% |
| Doctorate | 9 | 4.5% | 97.5% |
| Not specified | 4 | 2.0% | 99.5% |
| Others | 1 | 0.5% | 100.0% |
| Total | 199 | 100.0% | |

## Appendix 2.2: Graphical Analysis

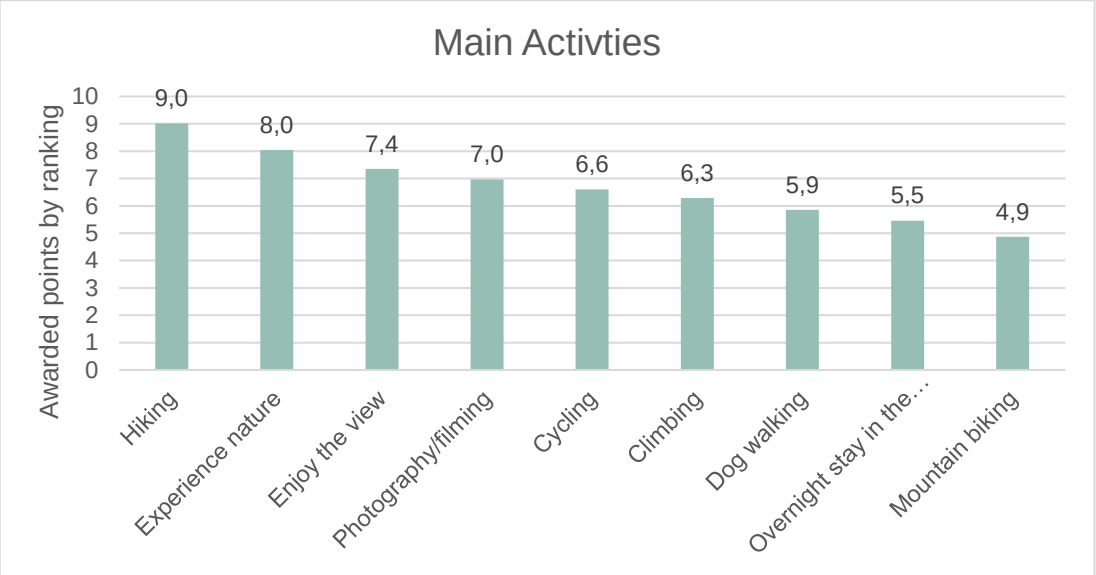
### 2.2.1: How often have you been to the Saxon Switzerland National Park? (N=212)



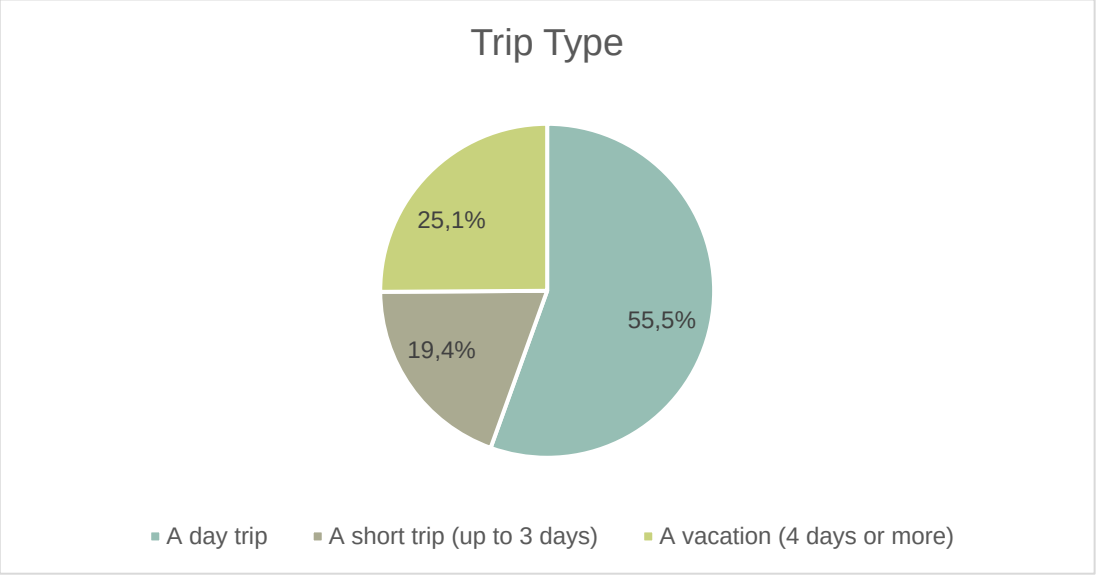

### 2.2.2: How regularly do you visit the Saxon Switzerland National Park? (N=206)



**2.2.3: What is your main activity when visiting Saxon Switzerland National Park? (N=212)**

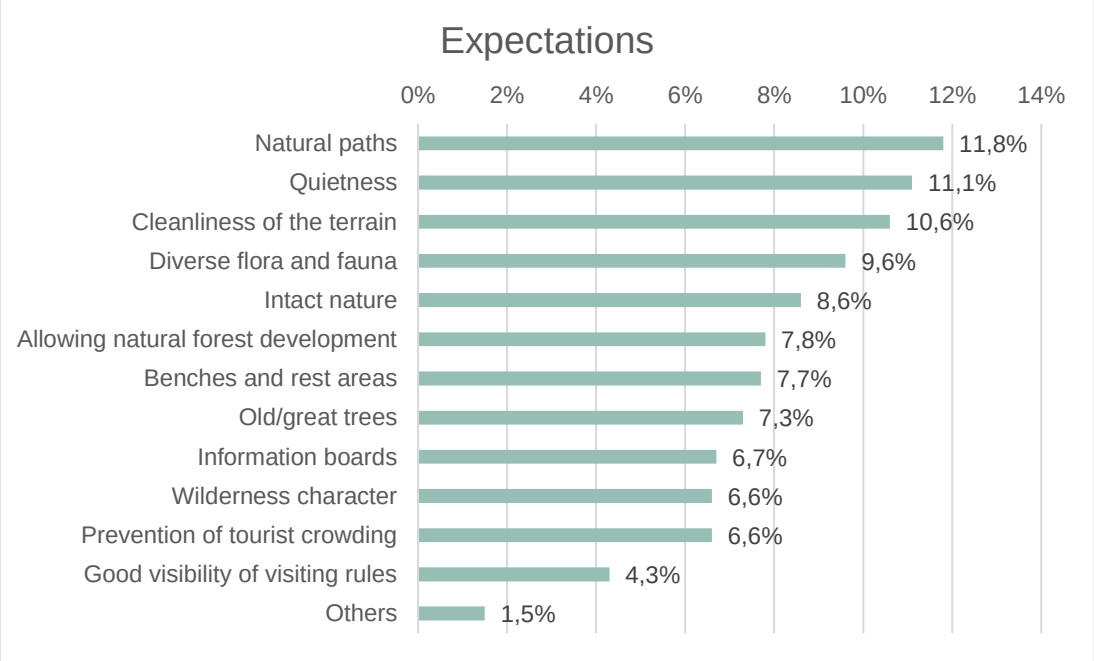



**2.2.4: Your last visit to the National Park Saxon Switzerland took place in the context of: (N=211)**

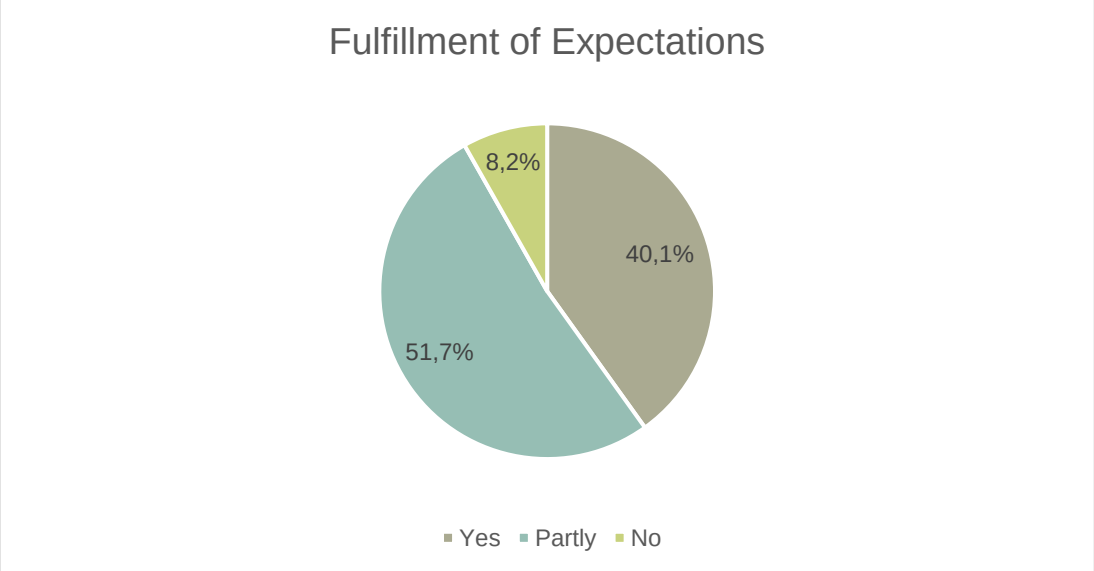


### 2.2.5: What do you expect of a good National Park? (N=212)

Multiple answers possible

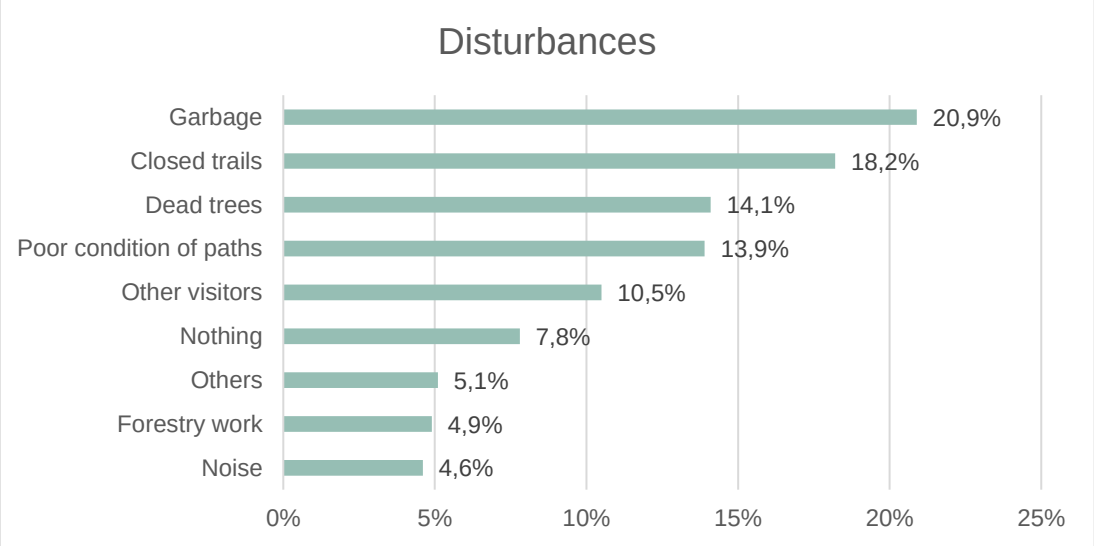



### 2.2.6: Does the Saxon Switzerland National Park meet these expectations? (N=207)

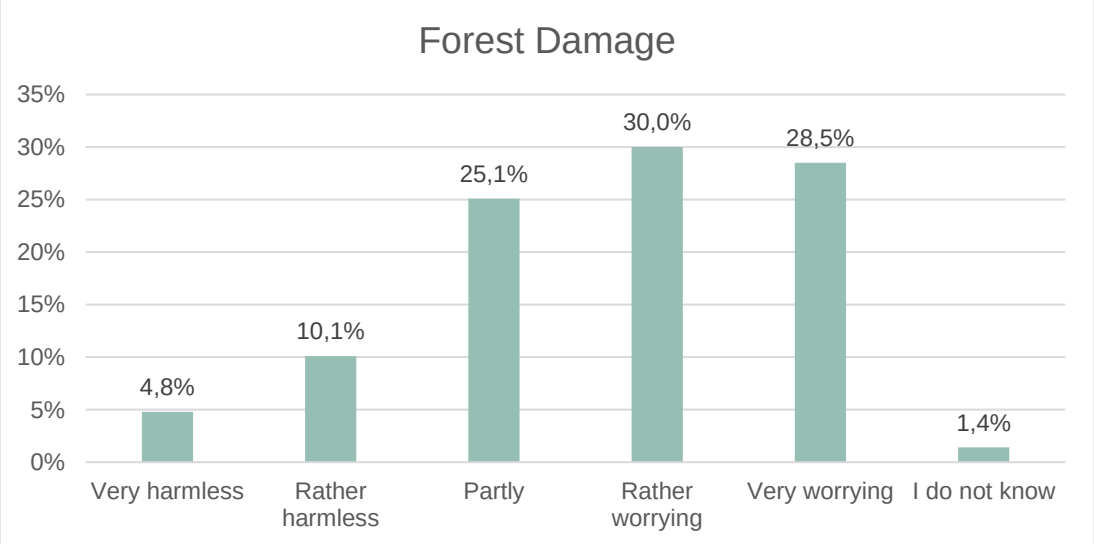


### 2.2.7: What particularly bothered you during your last visit? (N=212)

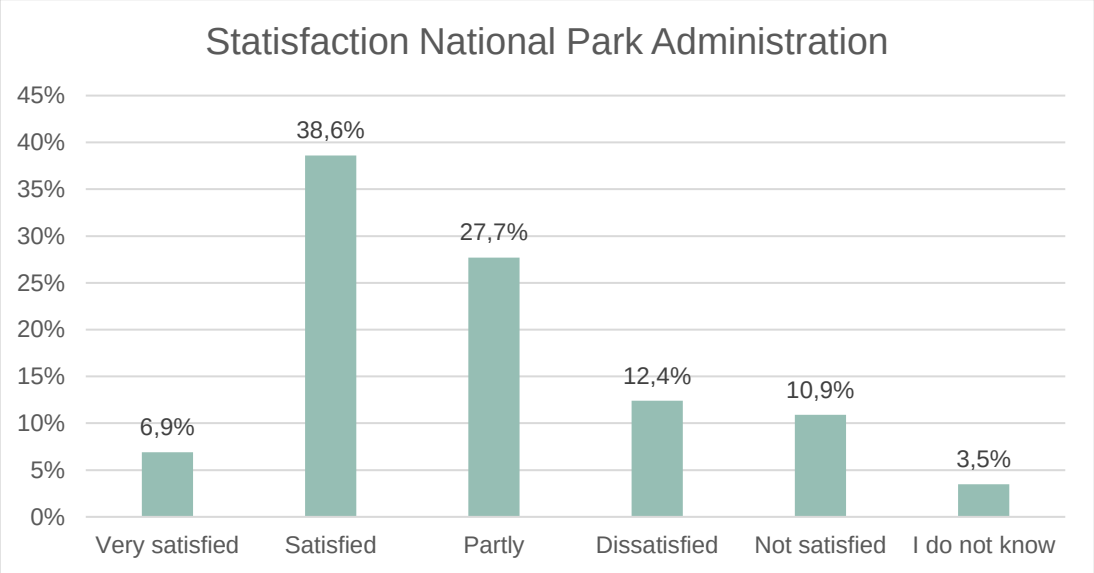
Multiple answers possible



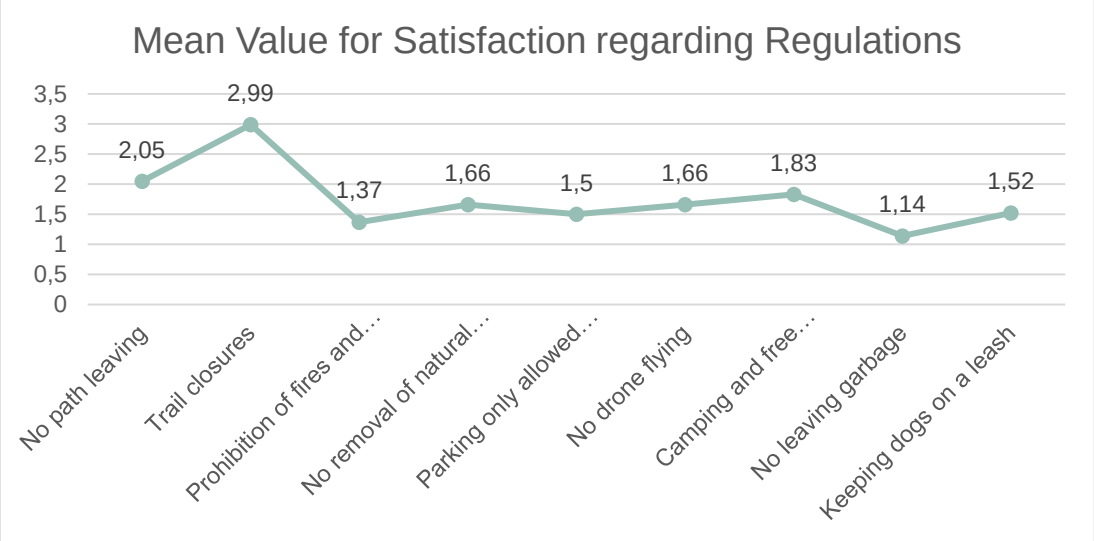

### 2.2.8: How worrying do you find the forest damage in the Saxon Switzerland National Park? (N=207)



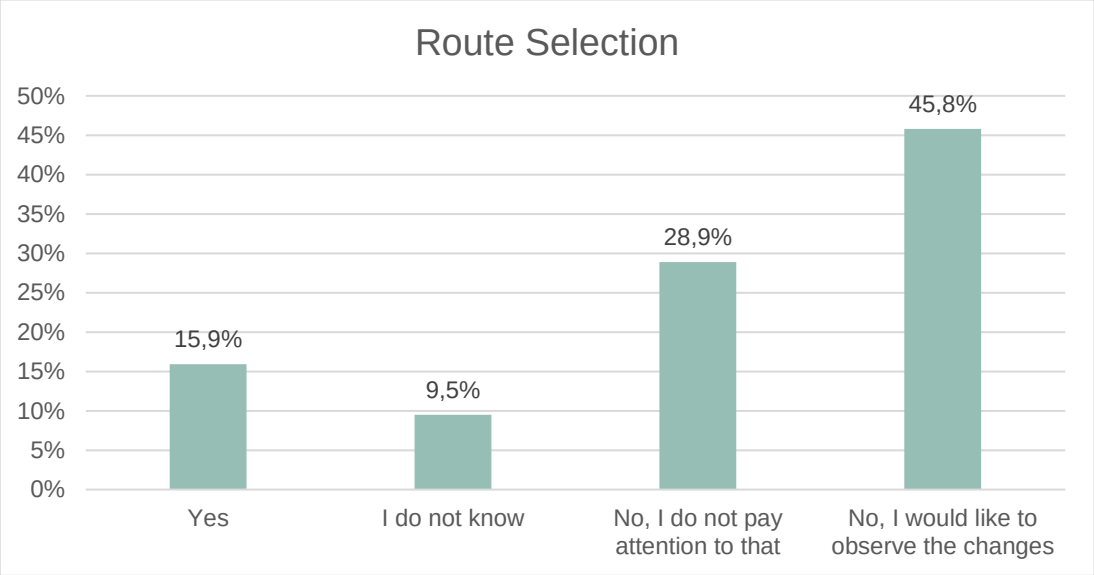
**2.2.9: How satisfied are you with the work of the Saxon Switzerland National Park regarding nature conservation and forest management? (N=202)**



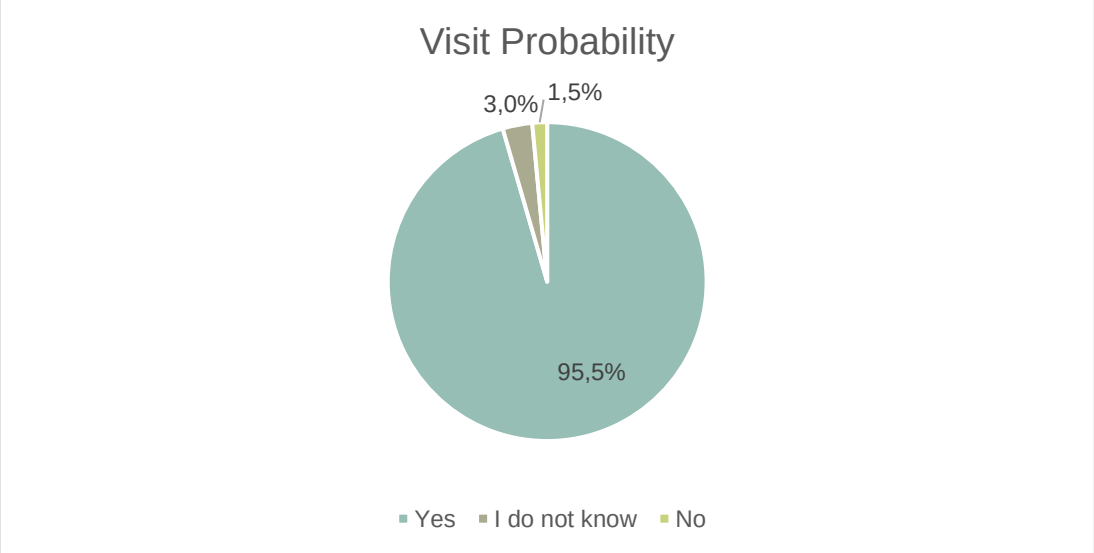

**2.2.10: How would you assess the regulations enacted to safeguard the park's natural resources for visitors? (N=**



### 2.2.11: Will you avoid trails with forest damage in your route selection in the future? (N=201)

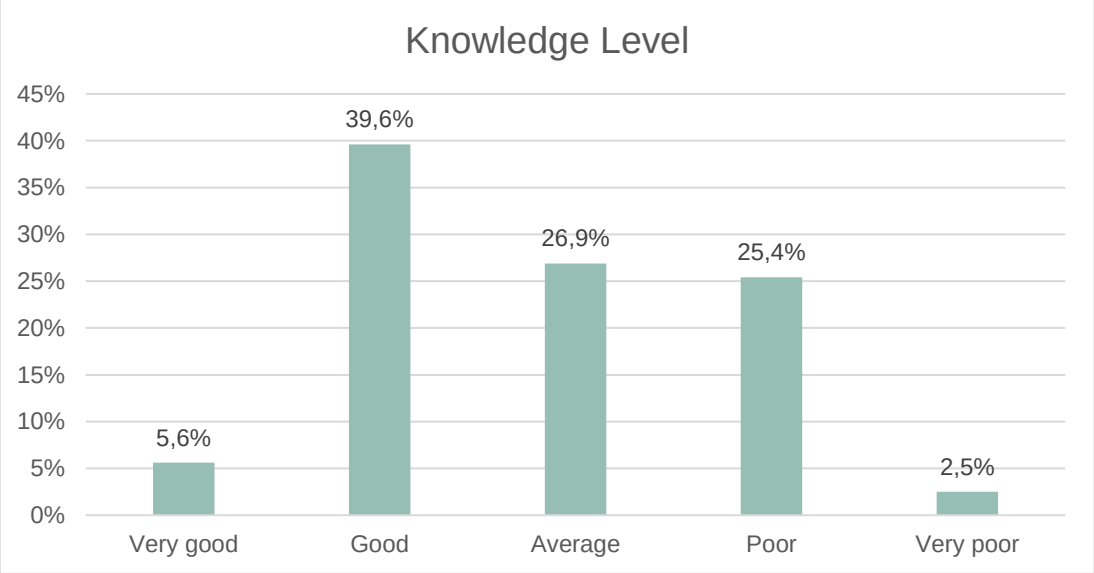



### 2.2.12: Will you probably visit the Saxon Switzerland National Park again in the future? (N=202)



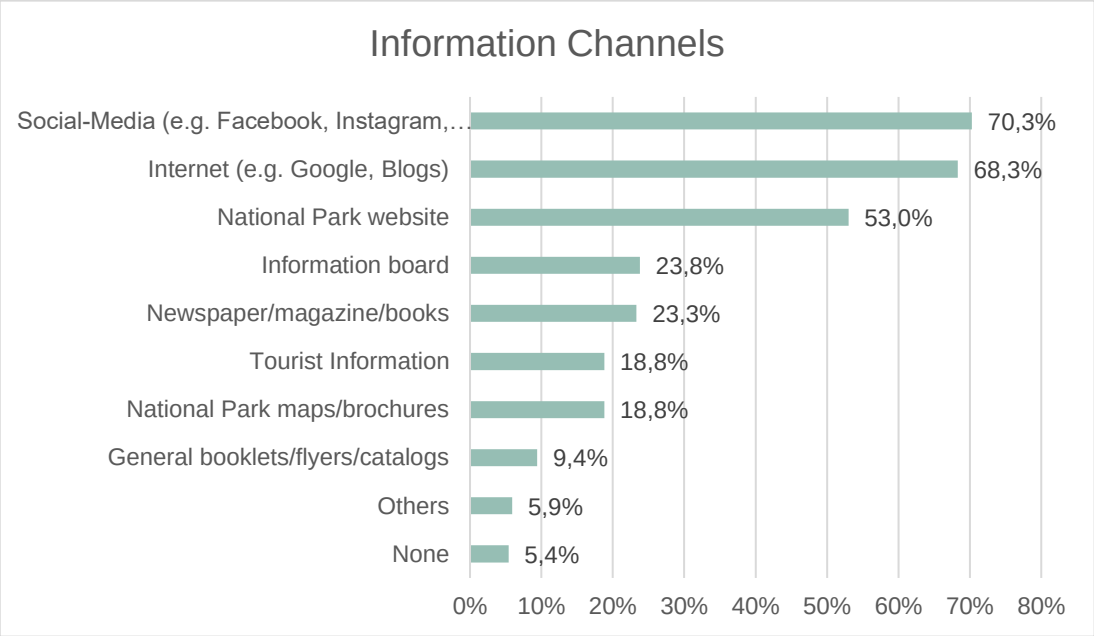
**2.2.13: Are the forest damages or the danger they pose the reason why you do not want to visit the National Park Saxon Switzerland or are still unsure? (N=8)**

**2.2.14: How well do you feel informed about current changes in the forest? (N=197)**

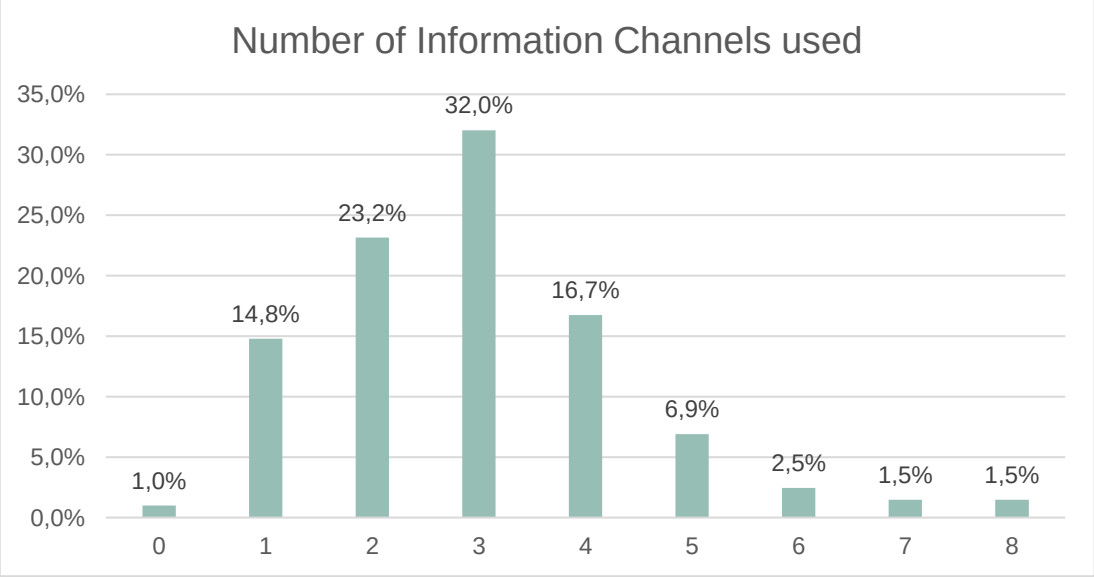


### 2.2.15.1: Which of the following media or channels did you use to find out about it? (N=203)

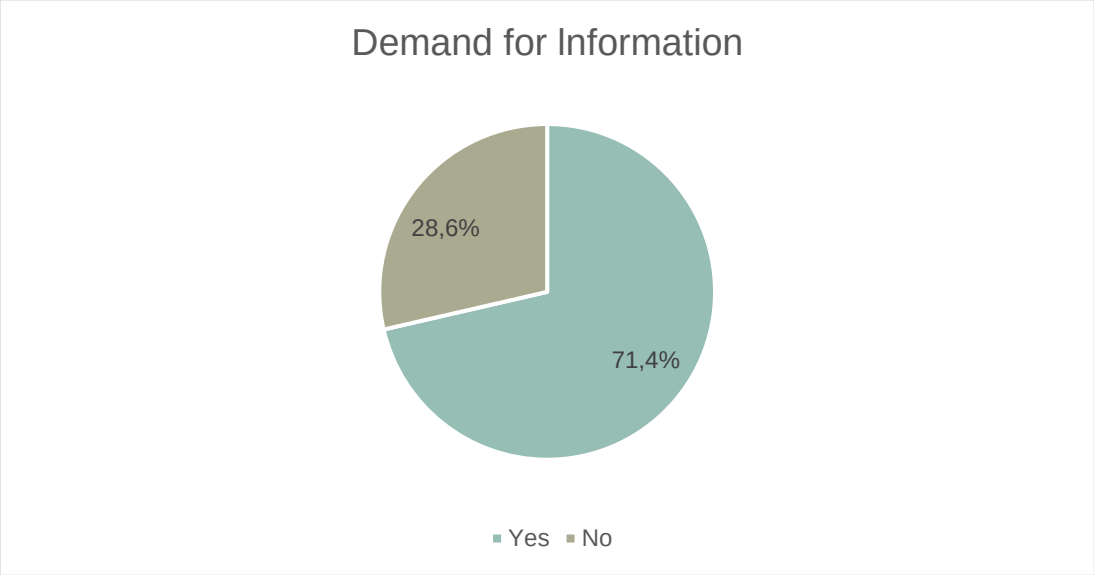
Multiple answers possible



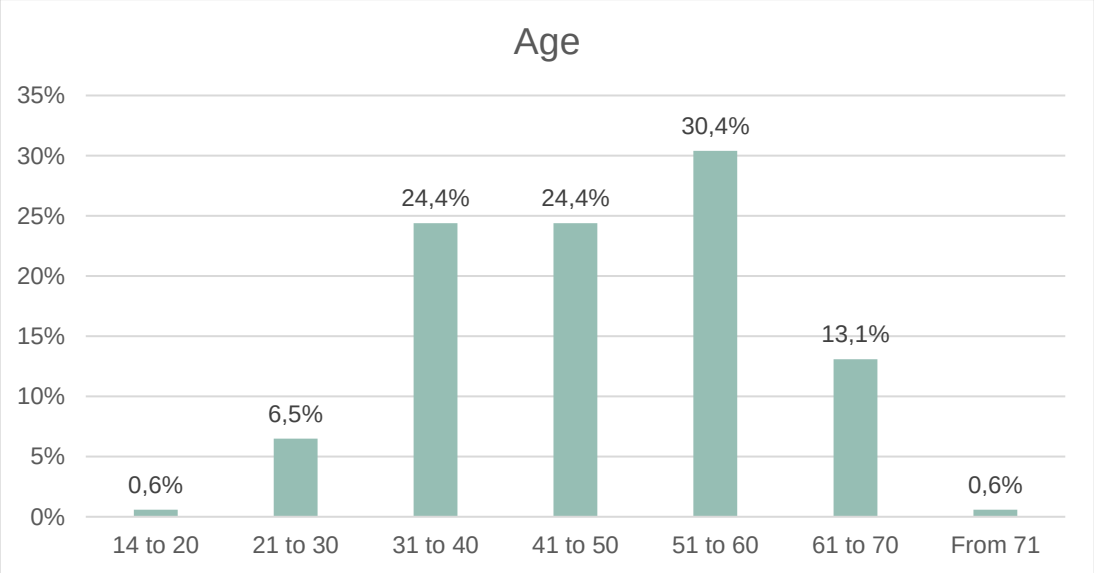

### 2.2.15.2: Which of the following media or channels did you use to find out about it? (N=203)



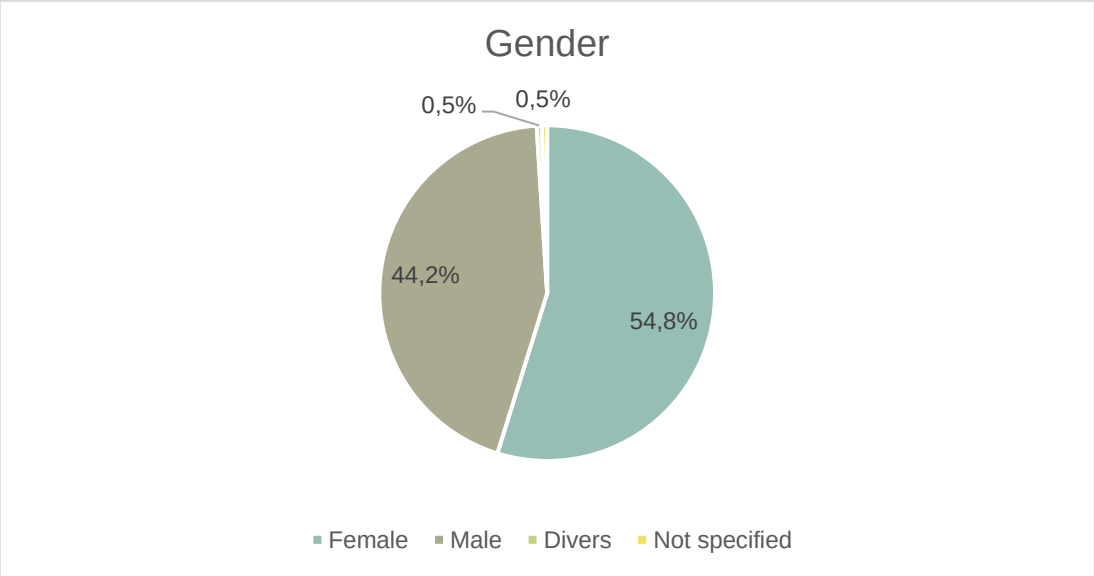
### 2.2.16: Would you like more information from the Saxon Switzerland National Park about changes in the forest? (N=199)




### 2.2.17: How old are you? (N=168)

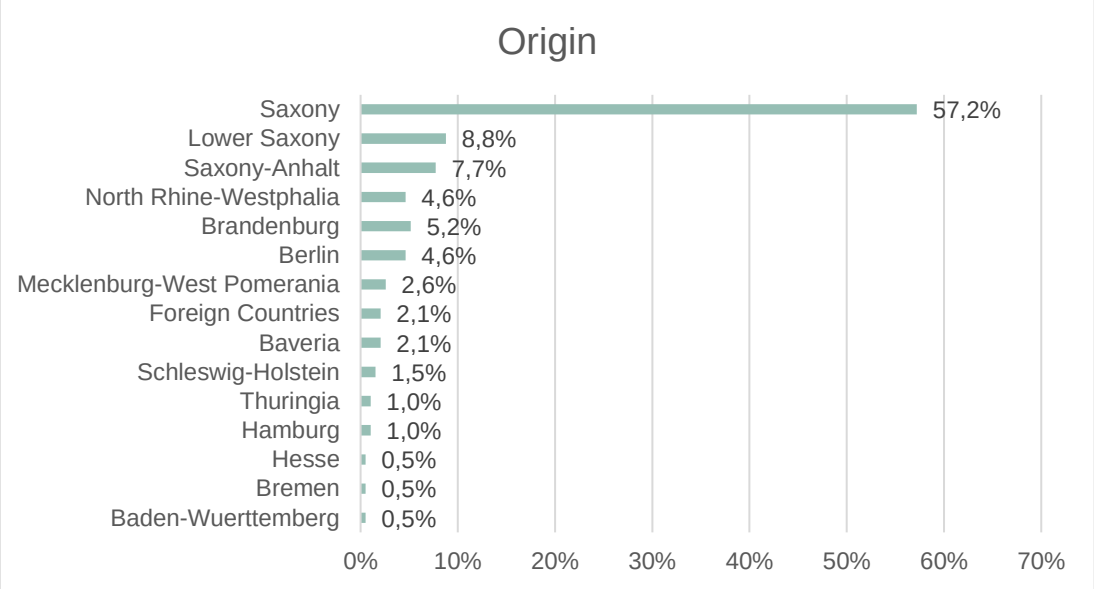


### 2.2.18: What is your gender? (N=199)

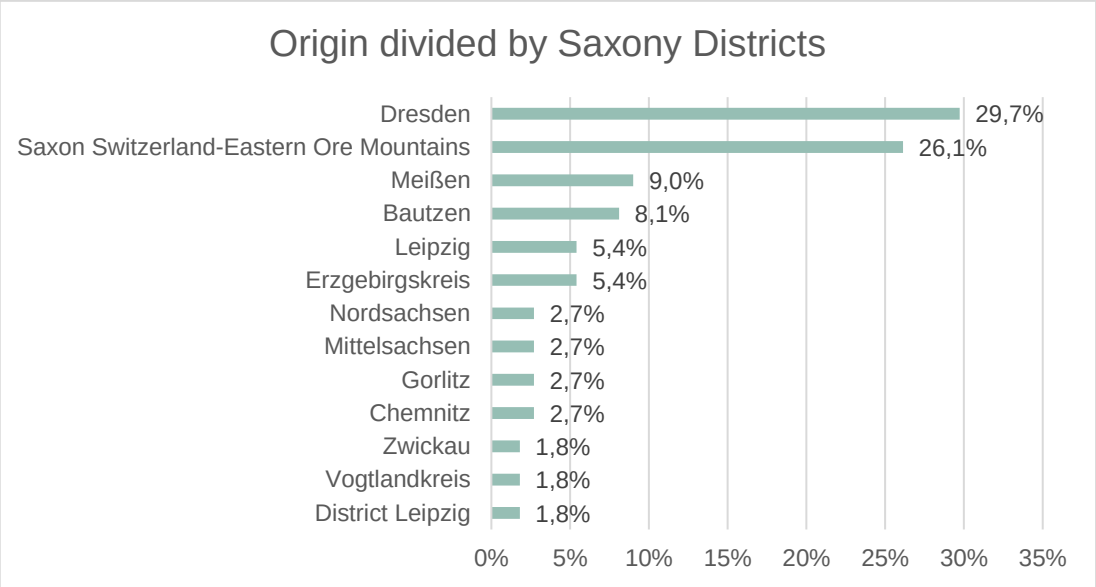



### 2.2.19: Where are you from?

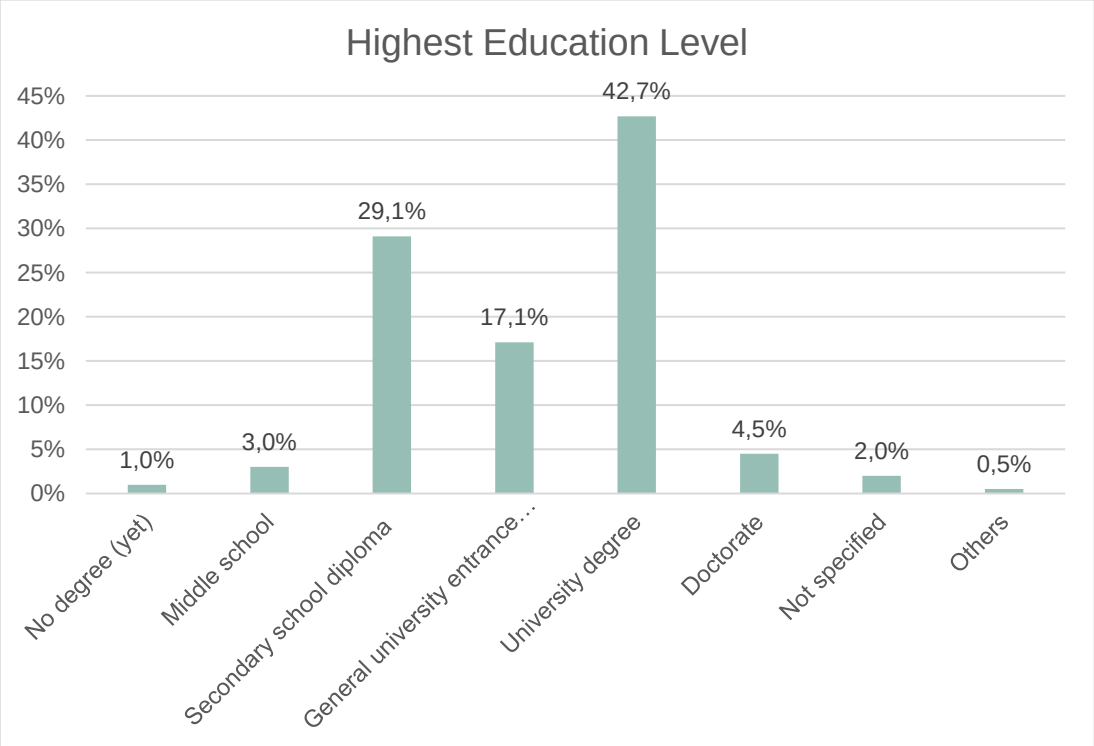
### 2.2.19.1: Overview of Origin (N=194)



### 2.2.19.1: Origin in Saxony (N=111)




### 2.2.20: What is your highest level of education? (N=199)



# Appendix 2.3: Open Responses

## 2.3.1: What is your main activity when visiting Saxon Switzerland National Park? (N=7)

| Main Activities: Others | |
|---|---|
| Category | Open Responses |
| Motorcycle riding | • „Motorrad fahren” |
| Inline skater riding | • „Inliner fahren“ |
| Relaxation | • „Entspannen“<br>• „Auszeit“<br>• „Wellness“ |
| Food | • „Essen“ |
| Meeting other people | • „Nette Menschen treffen“ |

## 2.3.2: Does the Saxon Switzerland National Park meet these expectations? (N=20)

| Expectations: Others | |
|---|---|
| Category | Open Responses |
| Increased interplay between cultural landscape and nature conservation | • „Zusammenspiel von Kulturlandschaft und Naturschutz (ohne Unterordnung der Kulturlandschaft)“<br>• „Erhält der Kulturlandschaft, Freischneiden der Wege und Aussichtspunkte“<br>• „Natürlich ist es notwendig einen Kompromiss zwischen Natur und Mensch zu finden. Der Raum in der SS ist nicht riesig, sodass man eben einen Teil für kommerziellen Tourismus freigen muss.“ |
| No further tourism development | • „Verbot für Tourismus”<br>• „Kein Bebauung der Natur für Tourismus“<br>• „Ruhe und am besten keine Menschen“ |

| | |
|---|---|
| Improvement of touristic infrastructure | • „Ausreichend Parkplätze“<br>• „Öffentliche Toiletten, wegen Tagestouren“<br>• „Currywurst und Cola überall“<br>• „naturnahe, einfachste Übernachtungsoptionen wie entlang des Forststiegs“<br>• „Funktionierender ÖPNV“<br>• „Hundekotbeutel“ |
| Preservation of historic trail network | • „Erhalt der kulturellen Vergangenheit (in der Sächsischen Schweiz: historische Wege/Steiganlagen):“<br>• „historisches Wegenetz” |
| Accessibility of all paths | • „Alle Wege begehbar!”<br>• „Freien Zugang zur Natur, einsame Wege“ |
| Letting nature be nature | • „Dass alte Bäume einfach liegen gelassen werden. Die Natur erholt sich vielfach selbst. Nicht ständige Neuanpflanzungen...“<br>• „eine Mindestdistanz zur Kulturlandschaft und Siedlungen“ |
| Unique character | • „Einzigartiger Charakter” |

### 2.3.3: What particularly bothered you during your last visit? (N=22)

| Disturbances: Others | |
|---|---|
| Category | Open Responses |
| Insufficient touristic services | • „mangelhaftes öpnv-angebot“<br>• „Teilweise schlechte Wanderwegsschilder(unklare und verwirrende Wegführung)” |
| Parking fees | • „Zeiten am ParkTicketautomaten (Sonnenaufgangsfotografie)“<br>• „Das die Parkautomaten nur mit Münzen funktionieren!“<br>• „Überhöhte Parkplatzgebühren, es gibt keine Kurztarife für Fotografen, oft nur Ganztageskarten“<br>• „einige wilde Radfahrer, Parkplatzgebühren” |

| | |
|---|---|
| Cyclists | • „einige wilde Radfahrer, Parkplatzgebühren”<br>• “Mountain Biker” |
| Visitors, who do not respect national park regulations | • „Nichteinhalten von Wegsperrungen durch andere“<br>• „Freilaufende Hunde“<br>• „Rauchende Leute im Wald“ |
| Too much tourism | • „Touristische Infrastruktur zerstört Leben”<br>• „Zu viel Individual Verkehr“<br>• „Systematische Zerstörung der historischen touristischen Infrastruktur“<br>• „Speziell die hintere SS sollte der Natur überlassen werden. Vielleicht kann man in der Nähe der Ortschaften eine Feuerschwelle schaffen“ |
| Uncleared areas | • „unberäumte Gebiete mit Borkenkäferbefall, hier muss man eingreifen“<br>• „Verbotene historische Wege“ |
| Others | • „Die abgestorbenen Bäume haben mich nicht gestört sondern machen mir Angst aufgrund des Borkenkäfers<br>• „Wegsperrung war nachvollziehbar, aber unerwartet“ |

### 2.3.4: Which of the following media or channels did you use to find out about it? (N=11)

| Information Channels: Others | |
|---|---|
| Category | Open Responses |
| Studies and job | • „Studium Forstwissenschaften“<br>• „Bin selbst vor Ort“<br>• „Bin allgemein gut im Thema eingearbeitet (Studium Forstwissenschaften, Job im grünen Sektor).“<br>• „Tourguide“ |
| Television Reports | • „Sachsenspiegel, MDR Fernsehen“<br>• „Fenrsehberichte (Sachsenspiegel)“ |

| | |
|---|---|
| Channels of the National Park Saxon Bohemian Switzerland | • „Facebook-Seite des Nationalparks Böhmische Schweiz“<br>• “homepages Böhm” |
| Sächsischer Bergsteigerbund | • „SBB“ |
| Personal networks | • „persönliche Netzwerke” |
| Newsletter Sandsteinwandern | • „Sandsteinwandern“ |

### 2.3.5: What is your highest school degree? (N=1)

- 10 Klasse POS

# Appendix 2.4: Correlation

## 2.4.1: Pearson-Correlation Visit Frequency and Forest Damage

| Pearson-Correlation | | | |
|---|---|---|---|
| | | Visit Frequency | Forest Damage |
| Visit Frequency | Pearson-Correlation | 1 | 0.105 |
| | Sig. (2-Tailed) | | 0.134 |
| | N | 204 | 204 |
| Forest Damage | Pearson-Correlation | 0.105 | 1 |
| | Sig. (2-Tailed) | 0.134 | |
| | N | 204 | 204 |

## 2.4.2: Number of Information Channels used and Knowledge Level

### 2.4.2.1: Contingency Table

| Contingency Table | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Number of Information Channels used | | | | | | | Total |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| Knowledge Level | Very good | 0 | 4 | 1 | 2 | 2 | 1 | 0 | 1 | 11 |
| | | 0.0% | 2.0% | 0.5% | 1.0% | 1.0% | 0.5% | 0.0% | 0.5% | 5.6% |
| | Good | 5 | 14 | 32 | 17 | 6 | 2 | 0 | 2 | 78 |
| | | 2.5% | 7.1% | 16.2% | 8.6% | 3.0% | 1.0% | 0.0% | 1.0% | 39.6% |
| | Aver-age | 14 | 12 | 16 | 8 | 3 | 0 | 0 | 0 | 53 |
| | | 7.1% | 6.1% | 8.1% | 4.1% | 1.5% | 0.0% | 0.0% | 0.0% | 26.9% |
| | Bad | 9 | 17 | 13 | 4 | 3 | 2 | 2 | 0 | 50 |
| | | 4.6% | 8.6% | 6.6% | 2.0% | 1.5% | 1.0% | 1.0% | 0.0% | 25.4% |
| | Very bad | 1 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 5 |
| | | 0.5% | 0.0% | 1.0% | 0.5% | 0.0% | 0.0% | 0.5% | 0.0% | 2.5% |
| Total | | 29 | 47 | 64 | 32 | 14 | 5 | 3 | 3 | 197 |
| | | 14.7% | 23.9% | 32.5% | 16.2% | 7.1% | 2.5% | 1.5% | 1.5% | 100.0% |

### 2.4.2.2: Chi-Square-Test

| Chi-Square-Test | | | |
|---|---|---|---|
| | Value | df | Asymptotic significance (two-tailed) |
| Pearson-Chi-Square | 52.027[a] | 28 | 0.004 |
| Likelihood-Quotient | 48.993 | 28 | 0.008 |
| Correlation linear-with-linear | 5.527 | 1 | 0.019 |
| Number of valid cases | 197 | | |

### 2.4.2.3: Symmetrical dimensions

| Symmetrical dimensions | | | |
|---|---|---|---|
| | | Value | Approximate Signifi-cance |
| Nominal dimension | Phi | 0.514 | 0.004 |
| | Cramer V | 0.257 | 0.004 |
| | Contingency Coeffi-cient | 0.457 | 0.004 |
| Number of valid cases | | 197 | |

### 2.4.3: Contingency Table Knowledge Level and Demand for Information

| Contingency Table | | | | |
|---|---|---|---|---|
| | | Demand for Information | | Total |
| | | Yes | No | |
| Knowledge Level | Very good | 6 | 5 | 11 |
| | | 3,1% | 2,6% | 5,6% |
| | Good | 46 | 31 | 77 |
| | | 23,6% | 15,9% | 39,5% |

| | | | | |
|---|---|---|---|---|
| | Average | 41 | 12 | 53 |
| | | 21,0% | 6,2% | 27,2% |
| | Bad | 42 | 7 | 49 |
| | | 21,5% | 3,6% | 25,1% |
| | Very bad | 4 | 1 | 5 |
| | | 2,1% | 0,5% | 2,6% |
| Total | | 139 | 56 | 195 |
| | | 71,3% | 28,7% | 100,0% |

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## Eidesstattliche Erklärung

Hiermit versichere ich, dass ich die vorliegende Arbeit bisher bei keiner anderen Prüfungsbehörde eingereicht, sie selbstständig verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt sowie Zitate kenntlich gemacht habe.

Woltersdorf, 05.05.2023

Ort, Datum Eigenhändige Unterschrift

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