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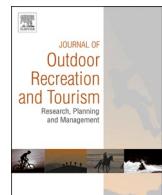
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Research Article

## “There will be mushrooms again” – Foraging, landscape and forest fire



Andrew Butler <sup>a,\*</sup>, Elin Ångman <sup>a</sup>, Åsa Ode Sang <sup>b</sup>, Ingrid Sarlöv-Herlin <sup>b</sup>, A. Åkerskog <sup>b</sup>, Igor Knez <sup>c</sup>

<sup>a</sup> Swedish University of Agricultural Sciences, Department of Urban and Rural Development, Box 7012, 75007, Uppsala, Sweden

<sup>b</sup> Swedish University of Agricultural Sciences, Department of Landscape Architecture, Planning and Management, Box 58, 23053, Alnarp, Sweden

<sup>c</sup> University of Gävle, Faculty of Health and Occupational Studies, 80176, Gävle, Sweden

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### ABSTRACT

In this paper, we address the relevance of recreational foraging, picking berries and mushrooms, for developing connection to nature and what happens when that practice is interrupted by drastic landscape change. We use the site of the largest forest fire in modern Swedish history as a case to examining the relevance of foraging. In previous studies, positive associations have been observed between the activity of picking berries and mushrooms with landscape-identity prior to forest fires. The results suggest that the more participants enjoyed foraging, the stronger their attachment to the landscape as well as memories and reasoning about the landscape. These relationships remained after the area has been drastically altered by fire, implying a significant role of foraging for keeping “alive” the positive feelings and memories of the forest landscape. Through questionnaires and semistructured interviews, we examine why individuals forage, what foraging meant for them before the event and how they relate to the landscape and foraging after the fire. Our findings suggest that these connections are built on an interplay between place, practice and intimate knowledge. We conclude that foraging play an essential role in defining and developing connections to landscape which can act as the basis for stewardship of the landscape.

*Management implications:*

- In order to facilitate reconnection to the landscape after a forest fire there is a need to understand how individuals and communities related to the landscape before the fire.
- Foraging will always be reliant on issues of access, and specific management regimes.
- Cultural values and small-scale activities play an essential role in defining and developing connections to landscape. Connections which can ultimately inform a sense of responsibility and stewardship.
- Activities such as foraging are reliant on more than just the affordance provided by the physical and visual character of a landscape.

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### 1. Introduction

In the summer of 2014, the largest forest fire in modern Swedish history blazed across the county of Västmanland. The result was devastating to production forest, ecological habitats and residents' relation to the landscape (GUSTAFSSON et al., 2019; KNEZ et al., 2018; LIDSKOG et al., 2019; Lidskog & Sjödin, 2018). The fire transformed a landscape and the practices it supported.

Humans develop bonds to places they inhabit (INGOLD, 2011),

bonds which inform identity by reminding us of important personal and collective experiences (KNEZ, 2014). These bonds embody natural, psychological, social, historical, religious, cultural, and wellbeing dimensions (KNEZ & ELIASSON, 2017; KNEZ et al., 2009). Landscapes become important to us as individuals and communities; acting as reminders of experiences, providing the basis for aesthetic preferences, supporting practices, and holding symbolic meanings developed and shared by social groups (KOOISTRA et al., 2018).

Natural disasters are frequently related to emotional and health

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\* Corresponding author.

E-mail address: [andrew.butler@slu.se](mailto:andrew.butler@slu.se) (A. Butler).

related problems including stress after volcanic eruptions (ADAMS & ADAMS, 1984), an increase in levels of depression and anxiety after hurricanes (Neria & Shultz, 2012), and impact on wellbeing after forest fires (KNEZ et al., 2018). Natural disasters have also been shown to have negative influence on connection to places and landscapes (OLIVER-SMITH, 1996; RUIZ & HERNANDEZ, 2014) leading to long-term effects on human wellbeing and health (ALBRECHT, 2019; YZERMAN et al., 2004, pp. 317–341).

Cognitive and emotional post-fire recovery of individuals influences attachment to the landscape, as residents come to terms with their loss (EISENMAN et al., 2015; KOOISTRA et al., 2018). Numerous post forest fire studies have revealed that this loss correlates with impact to residents' well-being (BURNS et al., 2008; EISENMAN et al., 2015; KNEZ et al., 2018; KOOISTRA et al., 2018; PAVEGLIO et al., 2012; PAVEGLIO, KOOISTRA, et al., 2015). Understanding the impact to residents' well-being, resulting from catastrophic landscape change is vital for acknowledging the true impact of forest fires (PAVEGLIO, KOOISTRA et al., 2015; PAVEGLIO, BRENKERT-SMITH, et al., 2015; Butler et al., 2018; KOOISTRA et al., 2018).

Restoring connection to landscape poses a challenge as the features on which connections develop through psychological processes, personal experiences and practices may have transformed or disappeared entirely (PAVEGLIO, BRENKERT-SMITH et al., 2015). Encouraging local participation in post-fire restoration and decision making enables positive personal recovery (BURNS et al., 2008; TOMAN et al., 2008). Yet citizens need to feel that these activities provide meaningful opportunities to participate. (OLESEN & SHINDLER, 2010). Enabling individuals to get out and see the changing landscape conditions is recognised as being beneficial for redeveloping connections to the landscape (BURNS et al., 2008). Even small changes, such as the emergence of new vegetation eases concerns about the short- and long-term impacts on the landscape, developing a more positive outlook for landscape recovery (KOOISTRA et al., 2018).

Studies of visitors to US National parks have revealed localised negative impacts from forest fires, on the economy, pointing out reduction in use of affected areas (Duffield, 2013; KIM & JAKUS, 2019). These studies are somewhat contradicted by ENGLIN et al. (2001) whose studies in Idaho, Wyoming and Colorado show that forest fires have virtually no effects on recreational value of affected areas. Yet for local residents in both Sweden (LIDSKOG et al., 2019) and the US (RYAN & HAMIN, 2008) the impact of fire on of locally accessible forest represents a lost recreational resource. This loss is brought about through the fire itself and the post-fire management, both of which can prohibit visits and displace users (Kneeshaw, 2004; Brown, Rosenberger, Kline, Hall, & Needham, 2008).

The degree of engagement prior to the fire is a notable factor in how post-fire management is perceived (EDGELEY & PAVEGLIO, 2017). Recognising how individuals develop and maintain attachment to the landscape is central for understanding how connections are re-established after dramatic landscape change (Butler et al., 2018). Fundamental for developing attachment to landscape are the practices and activities undertaken in the landscape which facilitate connection (NESS, 2011; SCOTT et al., 2009; WYLIE, 2002) and provide a source of physical, mental, and social well-being (ABRAHAM et al., 2010). In a Nordic context foraging for mushrooms and berries is recognised as an important outdoor recreational activity (LINDHAGEN & BLADH, 2013), and has been shown to be a factor in maintaining positive feelings and memories of landscape after a dramatic forest fire (BUTLER et al., 2019).

In this paper we use the forest fire in Västmanland (further outlined in the methodology section) as a case for understanding how practices assist (re)connection to the landscape after catastrophic events. This paper examines individuals' involvement in foraging prior to the forest fire and their connection to the landscape after the event. We begin by engaging with academic literature relating to foraging. We then introduce our study of the impact of forest fires on foragers, based on qualitative, quantitative and mapped responses to a questionnaire and semi-

structured interviews. Our findings on the relevance of foraging before the fire and how this impacts on individuals' relationship to the landscape after the fire are then presented. Finally, we discuss the significance of the findings and the potential policy implications of forest fires on activities such as foraging.

## 2. Foraging

"What better than to encounter the orange folds of chanterelles pushing through the dark wet or the warm muffins of king boletes popping up through the crumbling earth. The excitement of colour, fragrance, and design – not to speak of pride to be the first to find them – well up "p.141 (TSING, 2012, pp. 141–154).

In this paper, foraging is recognised as the practice of gathering edible wild<sup>1</sup> fungi and plants. Numerous disciplinary fields study aspects of foraging, including; recreation and tourism (DE JONG & VARLEY, 2018; HALL, 2013); cognitive choice and context, (MAYA et al., 2019); resource management (WIERSUM et al., 2018); and political ecology, questioning justice and access to resources (STADDON, 2009). Through the following section, we draw on numerous disciplines to discuss the academic literature relevant to the case of the forest fire area in Västmanland.

In contrast to tropical countries, few people in Northern Europe rely on foraged products for their livelihood (WIERSUM et al., 2018). Across Europe, the decrease in foraging for provision of food is linked to increased urbanisation, rural exodus, modernization of lifestyles and industrialisation of food production (Reyes-García et al., 2015; WIERSUM et al., 2018).

Yet foraging is still an important activity in rural Europe, with studies estimating that half of the rural population collect wild food in some form (SCHULP et al., 2014). Increased recreational demand of a growing urban and peri-urban population has shifted the focus of foraging throughout Europe (EMERY et al., 2006; SCHULP et al., 2014, Reyes-García et al., 2015, Fusté-Forné, 2019). This is exemplified in Finland where foraging is the main purpose for recreational trips to nature (SCHULP et al., 2014). Foraging for wild edibles in Europe now revolves around the cultural services the activity provides; the non-material benefits obtained from ecosystems through spiritual enrichment, cognitive development, reflection, aesthetic experience and recreation (Reyes-García et al., 2015; Fusté-Forné, 2019).

Self-gathered wild produce provides food considered safe, of known provenance and a potential supplement in future times of need (WIERSUM et al., 2018). The majority of wild foods that foragers gather is consumed personally and with family, yet there is a degree of exchange of produce within communities; strengthening social relations and kinship (Fusté-Forné, 2019; EMERY et al., 2006; SHORT GIANOTTI & HURLEY, 2016). Gathering nature's produce is a way that foragers assert their rights to subsistence and to informal economic activities, involving non-capitalist exchanges; (EMERY et al., 2006; POE et al., 2013).

### 2.1. Foraging: knowledge and attachment

Many times, wandering, I have suddenly remembered every stump and hollow of the spot on which I stood—through the mushrooms I once encountered there. Conscious decision can also take me to a spot of past encounters, for the best way to find mushrooms is always to return to the places you found them before (TSING, 2012, pp. 141–154).

Foraging requires knowledge of the ecosystem and an ability to navigate the forests, skills that are difficult to obtain for those who do not visit a forest on a regular basis (SCHULP et al., 2014). Once berries and mushrooms are found, they will be found in the same location year after year (Fusté-Forné, 2019). Hence, foragers tend to return time and

<sup>1</sup> Wild refers to plants which grow unadulterated through cultivated.

again, becoming familiar with particular environments (DE JONG & VARLEY, 2018). Searching for wild edible produce requires foragers to look at their surroundings with at an increased level of detail, developing a keen eye over time (EMERY et al., 2006). Foragers become attuned to their landscape as a meaningful source of information (POE et al., 2013).

Through foraging, individuals come to learn about ecological interrelationships, seasonal patterns and the ways particular species and species associations thrive in specific conditions (EMERY et al., 2006; TSING, 2012, pp. 141–154). In this way, foraging contributes to personal interaction with and appreciation of nature (POE et al., 2014; SHORT GIANOTTI & HURLEY, 2016). Through the practice of foraging, individuals develop attachment to both their surroundings and the more-than-human others that co-inhabit them (POE et al., 2013). For foragers the activity of gathering wild produce plays a significant role in connecting to the environment, developed over time as memories are formed in specific sites with specific species (POE et al., 2013). Foraging acts as a source of appreciation and respect for nature (CHIPENIUK, 1995; ÖLLERER, 2015), as well as reinforcing a sense of ownership in local landscapes (CHIPENIUK, 1998; HALL, 2013). Yet the everyday practice of foraging also develops individual relationships with specific species making them more than simply ‘components’ of the natural environment (DE JONG & VARLEY, 2018; Fusté-Forné, 2019; LANDOR-YAMAGATA et al., 2018; POE et al., 2013). Individuals who forage also develop stronger emotional as well as cognitive attachment to the landscape than non-foragers (BUTLER et al., 2019).

For many foragers, childhood exposure is a key aspect in developing the practice (LANDOR-YAMAGATA et al., 2018) and for many the importance of foraging is based on traditions developed over several generations (EMERY et al., 2006; SCHULP et al., 2014). Through connections to cultural and family traditions wild food collecting and consumption becomes part of people’s identity, defining who an individual is through actions, memories and the development of a sense of collective cultural heritage (HALL, 2013; POE et al., 2013; SCHULP et al., 2014).

While foraging develops attachment to specific sites, it is not necessarily a detached and localised practice, but rather connects and moves between places, identities and performances (DE JONG & VARLEY, 2018). Foraging, becomes a practice of identity that enables connection and understanding to new landscapes as well as maintaining attachment to distant familiar landscapes through memories and practices (HALL, 2013), as knowledge and practices are transferred to new locations.

## 2.2. The Swedish context

Foraging in a Swedish context has predominantly revolved around gathering mushrooms and berries, both with their own distinct heritages. Gathering of berries, mainly lingon (*Vaccinium vitis-idaea*) and blueberries (*Vaccinium myrtillus*), has changed from a source of sustenance, to a source of extra income in the 19th century, to a recreational activity undertaken by an urbanised population by the middle of the 20th century (LA MELA, 2014). Mushroom picking on the other hand has not had the same tradition, only becoming a popular activity in Sweden, in the mid-20th century (Lindhagen and Hörnsten, 2000). The development of recreational foraging in Sweden coincides with the reaffirmation of the Right of Public Access and promotion of outdoor recreation. The relationships to landscape developed through the act of foraging has changed from a site for harvesting to a place for recreation (Lindhagen and Hörnsten, 2000). Foraging also develops a symbolic meaning, linked to experiencing and maintaining contact with nature (Lindhagen and Hörnsten, 2000).

Studies of outdoor recreation in Sweden, reveal foraging as an important recreational activity (BUTLER et al., 2019; Hörnsten, 2000; HULTMAN, 1983; LINDHAGEN & BLADH, 2013). A study by FREDMAN et al. (2019) revealed that 44.5% of Swedish residents questioned have

been out in the woods and fields to pick mushrooms. Foraging is not seen as a gendered specific activity being undertaken equally by females and males (Godtman Kling, 2020).

The ability to forage is tied up with access to resources, in the Swedish context this is based on ‘Allemansrätten’. Allemansrätten, translated to ‘the Right of Public Access’ (Naturvårdsverket, 2011), provides the right to pick mushrooms and berries on the majority of public and private land. Such rights have been important for non-commercial access to berries, herbs and mushrooms (SANDELL & SVENNING, 2011).

In Sweden, outdoor recreation close to home is perceived as a necessity (BOMAN et al., 2013), with areas characterised by forests having an important role in outdoor recreation (EZEBILO et al., 2015). The access provided by allemansrätten means that both adults and children are out in nature and undertake outdoor activities regularly (80% while on vacation, 50% at weekends) (FREDMAN et al., 2019). While the majority of Swedes are aware of allemansrätten, a quarter of Swedish residents born outside Europe do not know if foraging is allowed in the forest without prior permission (FREDMAN et al., 2019). Inhabitants of rural areas are more frequent visitors to nature areas for outdoor recreation than urban inhabitants; hence, rural inhabitants have more opportunities for outdoor recreation (FREDMAN et al., 2019).

## 3. Methodology

### 3.1. Study site

On the July 31, 2014, a small forest fire was inadvertently ignited during forestry work in Västmanland County, Sweden (map 1). Due to a variety of management and weather factors, the fire quickly spread to become the largest forest fire in modern Swedish history. By the 5th of August the fire had affected an area of approximately 14 000 ha, spread across four municipalities. The fire resulted in one fatality; destroyed over 20 houses; required almost 1200 people to be evacuated and 4500 people to be on stand-by for urgent evacuation; damaged or destroyed 1.4 million cubic meters of timber; and three nature reserves and ten habitat protection areas were affected (Lidskog and Sjödin, 2016; Lidskog and Sjödin, 2018). The total cost of the fire was estimated to be at least 100 million euros (SWEDISH CIVIL CONTINGENCIES AGENCY, 2015). On the 11th of August, twelve days after the initial event, the fire was finally considered to be under control.

The landscape had changed from a familiar green coniferous forest to a charred desolate and alien landscape with heat-shattered boulders whitened by the fire, denuded of moss and exposed to the elements (Fig. 1 before the fire; Fig. 2 after the fire). In spring of 2015, almost half of this landscape (6400 ha) was declared a nature reserve, a site to observe natural regeneration (Lidskog and Sjödin, 2016; Lidskog and



Fig. 1. Image of landscape character prior to the forest fire.



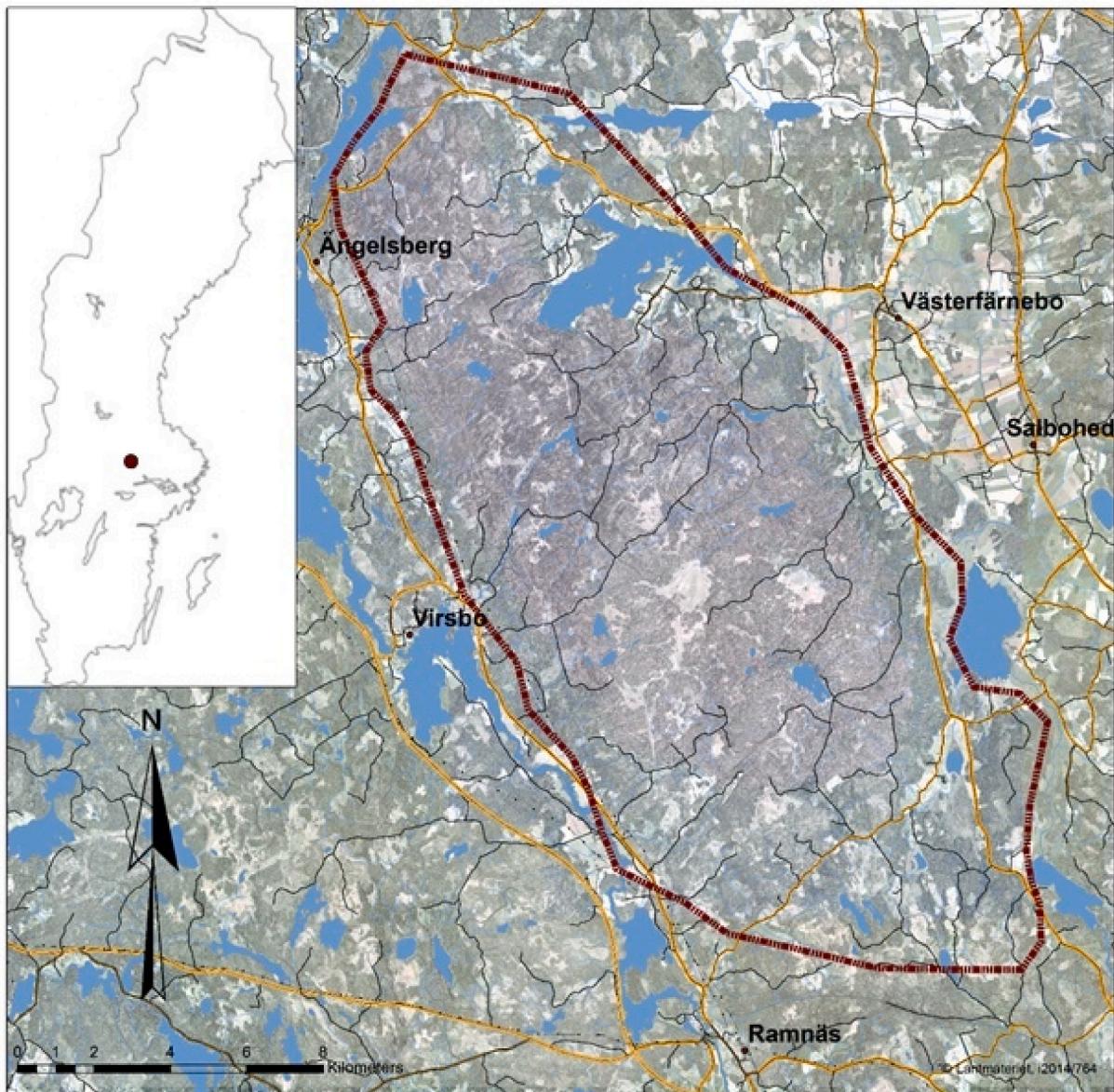
**Fig. 2.** Images of landscape character after the forest fire.

Sjödin, 2018).

Prior to the fire the landscape was considered part of a larger landscape character area described as:

“Rolling topography, ranging from between 50 and 100 m above sea level. Contains river valleys and small plains that stand out in the forested landscape .... Areas of summerhouses, wetland areas, heathland create diversity in the forest area with few key biotopes. Predominantly large-scale forest production, distributed among a few large forest owners” (ONSTEN-MOLANDER, 2016).

The affected area consisted predominantly of production forest in the ownership of 107 different landowners, ranging from small-scale family forest owners to private limited companies and the Swedish church (SKOGSSTYRELSEN, 2014). Through allemansrätten, the area was also an everyday landscape to the population who lived around the area; a destination for walking, cycling, foraging, swimming and being in nature. The area also held memories and stories of past practise and dreams and aspirations for the future. Individuals who habitually engaged with this landscape had an intimate and comprehensive understanding of its discrete places.



**Map 1.** Extent of fire area and location in Sweden.

### 3.2. Method

The data which informs this article was attained through a postal questionnaire and semi-structured interviews.

#### Questionnaire

A questionnaire was sent out one year after the fire. The timing was due to sensitivity of the issues (personal loss from the fire); to avoid potential questionnaire overload (competing with other studies); and also to allow residents time to reflect over their losses. Consequently, this study does not reflect the long-term process of reconnecting to the landscape, rather it addresses the impact and disconnection experienced in relation to the immediate landscape change.

In total, 2264 questionnaires were sent to households, randomly identified from a register of the population within the postal areas affected by the fire. Hence, the survey was not sent to a randomly identified stratified sample with relevant population demographics across the four effected municipalities, but to the individuals most affected. Recipients decided themselves who would fill out the questionnaire; hence, the researchers had no input of whom in a household completed the survey. The questionnaire was conducted in accordance with APA's (American Psychological Association) ethics code.

A total of 656 (29%) responses were returned; of these 48.4% were women and 51.6% men, distributed across seven age groups of 18–25 (3%), 26–35 (5.6%), 36–45 (10.2%), 46–55 (15%), 56–65 (26.4%), 66–75 (28.9%), and 76–85 (10.9%).

The survey comprised of multiple sections including questions about landscape related activities, experiences, perceptions, and attitudes before and after the fire. Quantitative, qualitative and map based data was generated from the questionnaire.

Central to this paper are two map-based open questions from the postal survey:

- Which places were important for you before the fire?
- Which places do you actively avoid today (one year after the fire)?

Respondents were asked to mark these places on a map. The purpose of the mapping exercise was to identify places of significance to individuals in their everyday landscape. The respondents were asked to briefly outline why these places were important in the first question and why they are avoided in the second.

Almost all who returned the questionnaire marked on the map in some form, from this we conclude that the respondents easily interpreted the mapping process. However, this generated two forms of data as individuals either marked a point (typically with a cross) or an area (creating a polygon). All polygons were converted to points, with the centre used to define a point; this was checked against other points by the researcher in order to attempt to confirm the position.

#### Interviews

The questionnaire was supplemented with semi-structured interviews from respondents identified through the questionnaire. Interviews were undertaken with eleven individuals between 12 and 18 months after the fire. Respondents covering a wide range of categories; age, gender, length of residency (from one year to sixty plus), land ownership, permanence of residents. Lasting between one and 2 h, the interviews built on the results of the questionnaire. As presented in Table 1, the interviews followed the chronological stages of *stability-change-progression* in connection to landscape attachment; (1) pre-disruption of landscape attachment; (2) disruption of landscape attachment; and (3) post-disruption (BROWN & PERKINS, 1992).

Maps were used during the interviews, to assist the researchers in understanding the context; as a means to keep the focus on the geographical landscape and away from the fire event itself; and to provide clarity to the data attained from the questionnaire maps. The transcribed texts from the interviews were analysed for content and

**Table 1**

Framework for semi-structured interviews.

Theme	Question points
Pre-disruption of landscape attachment.	What were special favourite places and routes? How do they differ from the surroundings? What activities did you undertake in these places? What are the most important experiences and personal traditions to this landscape?
Disruption of landscape attachment.	What has been affected? How has it felt (feels) to lose all this?
Post-disruption.	How did you handle the loss? How have you been able to process and move on?

broader discourses to identify when and how foraging were discussed. All responses have been translated by the authors.

### 4. Findings

#### 4.1. Questionnaire responses

##### 4.1.1. Before the fire

Out of the 656 responses, 316 respondents (48%) foraged in the fire area at least once a year prior to the fire. The gender division for foragers was 50% female, 50% male. The distribution of forager across age groups reflects the representative response for the questionnaire in general 18–25 (2%), 26–35 (4.5%), 36–45 (9%), 46–55 (15.5%), 56–65 (27%), 66–75 (33%), 76–85 (9%).

Respondents reported the importance of foraging on a Likert scale (1–7). From respondents who foraged at least once a year 41% recognised foraging as very important (7), 15.5% (6), 16% (5), 14% (4), 4% (3), 5% (2) and 3.5% (1) saw it as an unimportant activity.

In response to the map-based question, "Which places were important for you before the fire?" mushrooms or berries were mentioned as being significant for 104 respondents – 53% female, 47% male (map 2). As can be seen from map 2, individuals who engaged with foraging ranged more widely across the landscape with less discernible 'hot-spots'. This contrasts with non-foragers who focused around specific points in the landscape, predominantly the lakes and picnic sites.

For some respondents, foraging was stated as the focus of their activity in the area. Yet for most, foraging represented one of a catalogue of activities that made up their engagement with the landscape: "*It was here that I walked and cycled, picked berries and mushrooms*".

Others relate to foraging as part of a complete nature experience, dependent on more than just the activity itself: "*Lovely mushroom area, a great nature experience, quiet place with lovely bird song and sounds of the forest*". For many a personal attachment to the place had been built through foraging, recognising the area as their own: "*It was important because here I had my mushroom spot*".

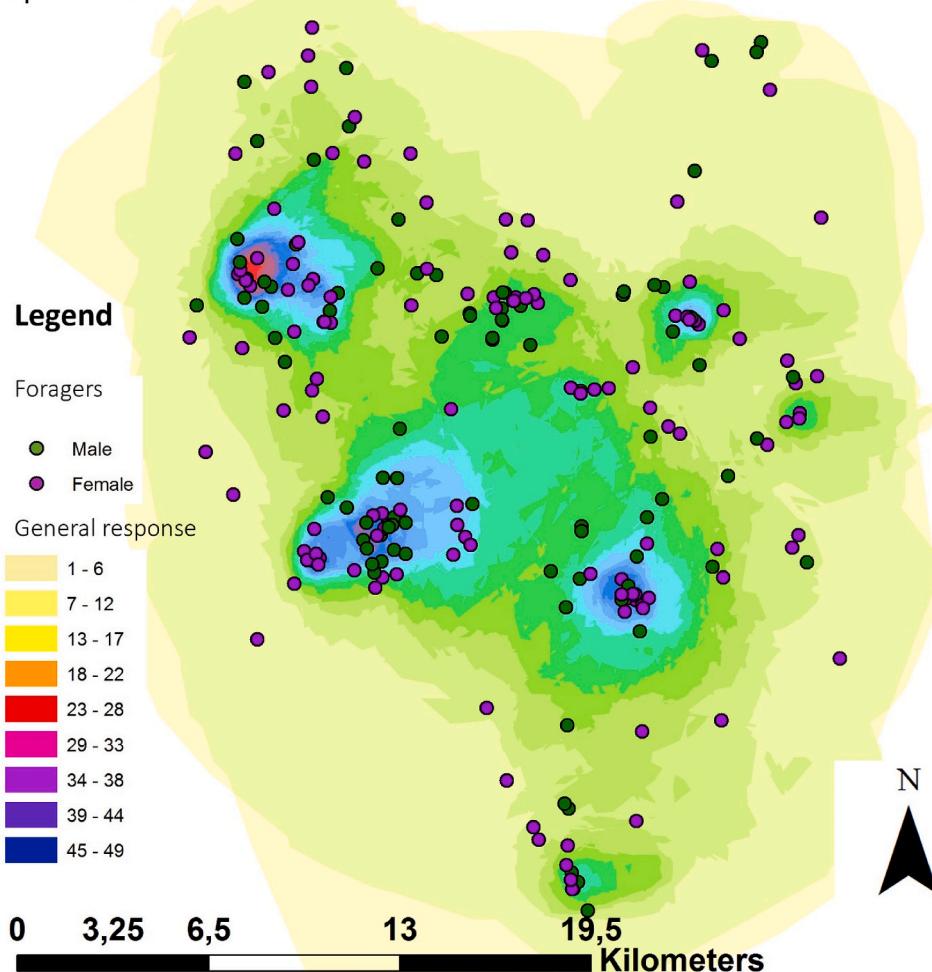
The act of foraging evoked social links as well as links to the site. Family ties to the area and the practice of foraging were frequently expressed: "*it was a lovely and intimate berry and mushroom spot, where we used to go with our children*". Foraging also acted as a trigger for remembering past generations and activities: "*As a child, I was often here with my parents and grandparents picking berries and mushrooms*".

These very short vignettes begin to reveal the attachment and familiarity that developed with the landscape through foraging as part of a complex and intimate relationship. This lifts the relevance of aspects other than the activity and the physical environment as important in developing a connection with the landscape through foraging.

##### 4.1.2. After the fire

In relation to the question, "*Which places do you actively avoid today?*" 200 respondents, who had previously foraged in the area, marked sites on the questionnaire map. A wide range of reasons were provided for avoiding places included: emotional impact (a sense of sadness, depression or sorrow); perceived risk in the area (from falling trees etc.);

Respondents that marked as area or point as important before the fire



Map 2. Mapped responses to the question "Which places were important for you before the fire?"

issues of access (paths having vanished and obstructed, or access not permitted); visual and sensory perceptions (the blackened landscape, the smell of soot, the noise of forestry machines); absence of activities; not wanting to be seen as disaster tourists; or simply that one has no need to be there. Many considered that visiting the areas would stir up memories both of the fire and of loss of the landscape and the activities it supported. Several respondents, while reflective of their loss were simultaneously curious to see the development of fauna and flora in the area after the fire.

Twenty-two individuals mentioned connections to foraging as reason for actively avoiding places within the area. Map 3 shows the areas these 22 individuals avoided after the fire. The hotspot for places avoided correlates with the boundary of the fire covering a much broader area than the favourite places. Unsurprisingly the results are similar for both foragers and non-foragers alike, with specific places having less significance. Yet this does not mean that the reasons for avoidance are the same for all. For some the reasons were pragmatic: "*There aren't really any berries and mushrooms there now, so there isn't really any reason to be there so much*". The loss of a much appreciated entity and the subsequent demise of the activities which this landscape supported was mentioned by some of the respondents: "*Our beautiful forest where we could just be; exercise, walk the dog, fish, swim, and pick berries and mushrooms has burnt down*". While others expressed more emotional reasons, having felt loss and expressing how they cope with this loss by finding alternative destinations to their familiar landscapes: "*It feels terrible now it has burnt*.

*There are no berries or mushrooms to pick. I choose to go to other forests*". For some there was even an even an almost nihilistic view of the future "*There will not be berries or mushrooms in my life.*"

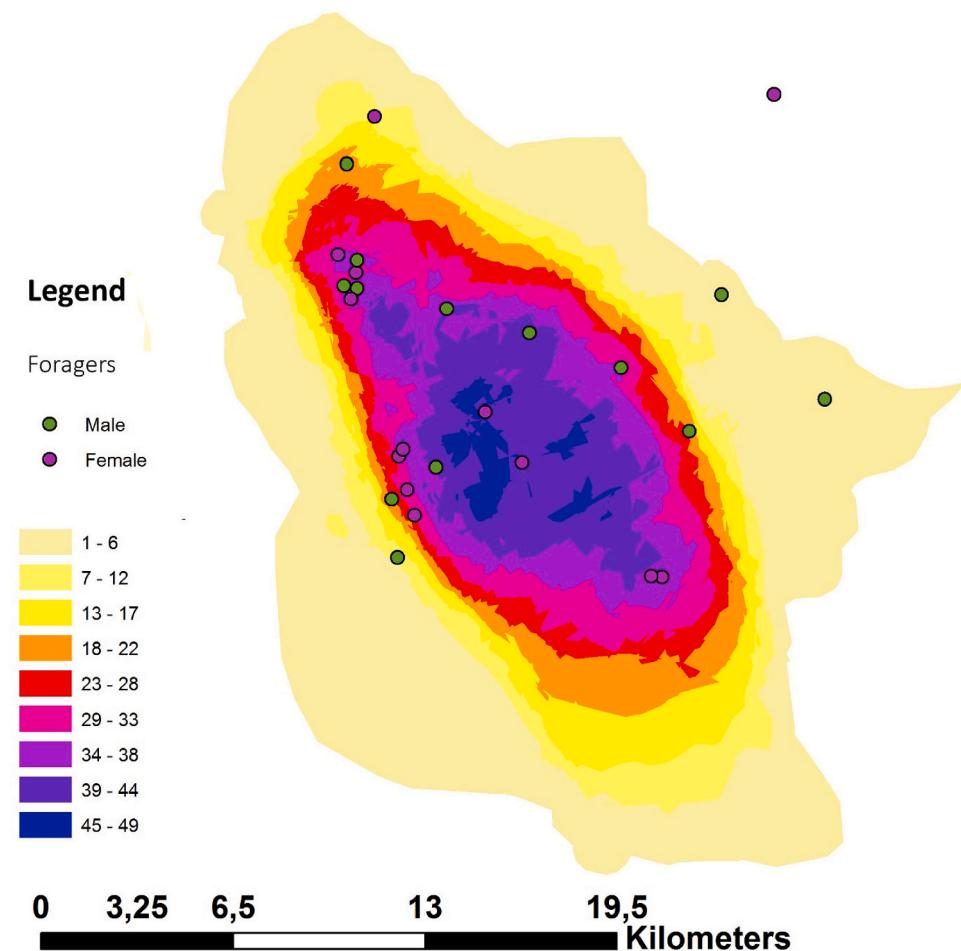
#### 4.2. Interview responses

It becomes clear from the questionnaire data that the importance of gathering mushrooms and berries lies in more than just the practice itself. The responses provided a glimpse of the complexity and intimacy of relations with landscape that develop through foraging. It is these relations that we investigate further through semi structured interviews.

##### 4.2.1. Foraging before the fire

Although foraging was highlighted as a source of attachment to the landscape and well-being of individuals, the collection of berries and mushrooms was rarely given as the sole purpose for being in the landscape. Gathering mushrooms and berries tended to be considered an incidental activity, as a positive outcome of undertaking other activities. Foraging was thus widely seen as a serendipitous activity. The resulting harvest is not of high importance for undertaking foraging in the case of Västmanland.

"When you pick berries then you take a walk, you find such nice places, like ... oh, there are lots of blueberries growing here, and so you pick berries there. You don't just go out to pick blue berries, I don't anyway. You take a basket or a bucket when you go for a walk and just



Map 3. Mapped responses to the question "Which places do you actively avoid today?"

have a look ..." Respondent 5.

Foraging was also recognised as one aspect of a more general engagement with the area. A recurring theme through the interviews was the relation between foraging and connection to nature, foraging as part of a series of practices undertaken with the landscape:

"We were just out in nature. Took a picnic, drank coffee and just wandered around. And if it was the time of year for berries or mushrooms, then you could pick some and you were still out in nature." Respondent 7.

Foragers tended to express knowledge of the landscape related to an intimate understanding of their surroundings. Hence, it is not just the knowledge of what is being picked, but also an understanding of the landscape, which develops through foraging.

Individuals' detailed understanding of the physicality provided a means of navigating and negotiating the landscape, including recognition of the location of familiar foraging spots:

"You pick mushrooms all the time, then you have an understanding of what is happening [in the landscape]." Respondent 2.

Being in the landscape and foraging exposes the forager to seasonal dimensions of change, bringing up surprises; small events that enhance their understanding of the landscape. For the interviewed foragers, change is part and parcel of the landscape, which despite familiarity brings up new revelations:

"We just found them by coincidence actually. We just went to look at the forest and we just found them, so we took several trips and then picked these large blueberries." Respondent 2.

There is also a longer temporal dimension, based on how knowledge matures over time. This relates both to landscape as experienced

through numerous encounters, and knowledge passed down through generations. The memories of foraging in the landscape in childhood, provide a link for keeping past practices, relations and memories alive:

"... my in-laws were real forest people, really good at [identifying] mushrooms, so it was just follow after. I was very good at mushrooms also thanks to them." Respondent 9.

Foraging and engagement with the landscape was also expressed as a legacy to pass on to the next generation.

Interviewees also mentioned a choice to suppress the spreading of knowledge, to maintain secrets about places, resources and activities:

"My brother knows almost every tuft of grass here. He's really interested in berries and mushrooms and stuff. He has secret places where there are cloudberry, mushrooms, cranberries and blueberries. He doesn't make their location public." Respondent 6.

This suppression of knowledge is also a significant aspect of the relationship to the landscape, strengthening a "my" feeling and attachment to the landscape. Numerous respondents spoke of 'my' mushroom spot or 'my' berry forest. This feeling of ownership was not expressed in relation to other activities.

The collection of mushrooms and berries was not considered an activity the respondents would travel further afield to do, even viewing the area as compensation for not travelling.

"We don't go out and travel much and do things. Rather ... we are home, pick a few berries and go for a walk, go down and swim and that kind of thing". Respondent 4.

Even respondents, who did not consider foraging as a significant for their connection to the area, recognised that it was an important activity for others and for the perceived identity of the landscape.

#### 4.2.2. Disconnection and coping

When discussing the area, a year to 18 months after the fire, an obvious feeling of loss was conveyed by the interviewees. It was clear to all that the area could no longer support foraging; the resource had gone. It was recognised that if individuals want to continue engaging in foraging they may need to find alternative, less familiar locations, transferring their knowledge to alternative sites.

Respondents discussed loss of a landscape and the disconnections from familiar places; the familiar became unfamiliar as respondents' knowledge of the site became redundant. The interviewees discussed the unfamiliarity of the physical and visual landscape. The loss of the foundations on which practices and traditions can develop:

"The landscape looks so very different ... it was so badly burned in some places that it is difficult to distinguish what was a path ... In some places there is no soil left, it is just stone, or small gravel ..." Respondent 1.

The loss of familiar features and structures in the landscape makes the act of orientation and navigation of once familiar places difficult:

"... before when there was a forest and you went for a walk, then you had your [landmarks] ... that tree or stone with the moss that looked different ... there was so much you could recall 'if I walk past there then I am on the right path'. You have places that you recognised ... but if I went this way today ... well, I think I would end up here somewhere else. But I'll try it one day." Respondent 4.

The intimate knowledge of the area that individuals had developed and understanding of the temporality this brought about was reflected after the fire as vegetation began to return.

"We were there in August [the year after the fire]. We got one of those wow experiences. Lingon, blueberries, heather. Heather looks so strange when it starts to come through, I thought 'what the heck is that?' Yes, it's heather. So beautiful and you are like 'ah now it's coming back' and so fast after only a year." Respondent 5.

Such observations after the fire also reflects that these individuals wanted to get out and see the landscape again.

There was even a semi-optimistic, pragmatic view of the future, that gathering mushrooms will be possible again but not necessarily in the near future.

"If you think back to how it was before and how it is now, it is certainly a big change. But still, it feels like, what should I say, it does not feel completely hopeless. It feels like there is a hope that yes ... life is coming back, at least the nature, very quickly. But we did not know that at first, then it felt more that it would just be a desert landscape all for a long, long time .... I think that after a while you saw that it started to green a little here and there and so, it felt better." Respondent 1.

## 5. Discussion

### 5.1. Foraging and landscape

A central aspect to foraging before the fire was the development of knowledge through continuous engagement with the landscape. Through foraging, individuals acquired intimate knowledge of species, habitats and places. Foragers developed increased familiarity with the produce to be harvested, the sites where they could be found and the means to navigate this landscape to be able to return to these sites again and again. We surmise from this that foraging is based on unique knowledge, not only knowledge of what is edible or palatable and its uses (culinary knowledge), but also how to read the landscape and its biological potential (biophysical knowledge) and a recollection of specific locations (spatial knowledge). Knowledge of foraging was recognised as an inter-generational legacy, frequently acquired in childhood and passed on to the next generation through shared the practice and experience.

There is also a temporal dimension to the knowledge that foragers hold. Continuous engagement with the landscape reveals the seasonal patterns, which despite familiarity brings up new and changing surprises

as recognised by EMERY et al. (2006). In Västmanland, foragers also understood the longer-term landscape management processes, such as forestry, which interrupted or disrupted their engagement with the landscape.

Gathering mushrooms and berries helps to develop a multifaceted understanding of landscape. Prior to the fire, foraging was one of a series of activities undertaken in the forest that helped forge connections with the landscape. The importance of foraging lies in more than just the practice of gathering the fruits of the forest. Through practice and intimate knowledge, foraging created a personal destination, a 'my place', in the landscape as well as a purpose when engaging with nature.

Numerous studies have lifted the significance of foraging for individual's wellbeing (BUTLER et al., 2019; FISCHER & KOWARIK, 2020; POE et al., 2014). From the study presented in this paper, two distinct factors can be identified relating to foraging and wellbeing. The first is the in-depth engagement with nature (see e.g. HARTIG et al., 1991), often stated as the reason for foraging; and the second is development of connections and attachment to place through practices and experiences (see e.g. KNEZ & ELIASSON, 2017), developing the sense of 'my' foraging area.

### 5.2. Foraging and forest fires

After the fire, foragers could see the possibility of transferring their practices to other sites. This requires a transfer of knowledge. While spatial knowledge is specific to a given landscape, culinary and biophysical knowledge are relevant for other locations (DE JONG & VARLEY, 2018; POE et al., 2014). Building on Rishbeth & Powell's (2013) study of place attachment in post-migration, we can assume that maintaining practices based on knowledge attained in the fire area has the potential to foster quicker connections to new sites as well as preserve the memories and stories connected to the fire area.

In the fire affected area, observing small positive changes in the landscape eased individual concerns about the future of the landscape in general (see also BURNS et al., 2008; KOOISTRA et al., 2018). To observe these changes requires individuals to visit and reengage with the landscape. We surmise that practices which individuals undertook before a fire act as an indicator of their post-fire engagement with the area, allowing them to observe the landscape as it begins to heal. The intimate knowledge which respondents expressed in relation to foraging and their understanding of the dynamic and the constantly changing nature of landscape, helped them see the effect of the fire as yet another temporary event. Interviewees and respondents to the questionnaire who lacked intimate understanding of the area, those who had the landscape as a backdrop for activities or remembered the area from a specific moment held a romantic image of a halcyon time, lacking the understanding of the temporality in the landscape and the changing details.

From our study, it is impossible to distinguish whether it is the practice of foraging or the nature of the people who undertake this practice that is the driving factor in their (re)connection to landscape. However, we can surmise that foragers possess a more positive sense of recovery for the landscape after forest fires. However, from our study we cannot determine whether the optimism which came through in the interviews was founded in foraging which develops deeper connection to the landscape or if it is their strong connection to the landscape which facilitates foraging.

### 5.3. Policy considerations

The ability to forage is founded on policy and management regimes that support conditions for certain species to thrive. Yet policy makers and forest managers give less attention to the cultural dimensions of forest use, which are trumped by economic and ecological dimensions. Cultural dimensions (especially small-scale lands use) tends not to be seen as part of forest sector development (POE et al., 2013; WIERSUM

et al., 2018). Yet these small-scale uses play an essential role in defining and developing connections, strengthening identity and support feelings of ownership, all of which inform a sense of responsibility and stewardship (SELMAN, 2012). Developing partnerships with foragers, in order to combine foragers and scientific knowledge in forest management strategies can help foster continued connection to the countryside as well as more nuanced understanding of the dynamics of the forest (EMERY et al., 2006). Ultimately recognising that foraging may be custodians of the future forest.

The connections which individuals develop with the landscape are based on all of the practices they undertake in a place. The same individual can experience a multitude of landscapes dependent on which activity is undertaken (SCOTT et al., 2009). Different recreational activities place different demands on the landscape, drawing on both tangible and intangible aspects. Certain activities rely purely on the affordance provided by the physical and tangible elements of the landscape (e.g. football, requiring open space); other activities rely on the physicality of the site and the aesthetic preferences of the individuals (e.g. trail running (Qvistrom, 2016)); and then there are activities reliant on memories, recollections, and intimate knowledge as well as physicality (e.g. foraging) (EMERY et al., 2006; TSING, 2012, pp. 141–154). Activities such as foraging become embedded in the landscape, requiring intimate knowledge which ultimately acts as a basis for emotional and cognitive connection (KNEZ et al., 2018).

When a landscape can no longer provide affordance for practices, new practices develop and pre-fire practices relocate to alternative sites, producing a potential source of conflict. This is the case as individuals attempt to re-establish activities after the fire. What does this do for the place abandoned and how does it work when projecting a previously understood landscape onto a new landscape? Allemansrätten has to be renegotiated as the innumerable, local, unwritten agreements and traditions need to be (re)negotiated with others (Sténs & Sandström, 2014), as users from outsider, stake their claim in this landscape. Managers need to be sensitive to the wide-ranging preferences of different user groups when decision-making after fires (BAWA, 2017).

Post disaster literature highlights the need to allow people to engage in the future of their landscape in order to rehabilitate themselves (GILL, 2005); whether through direct action or engagement in decision-making processes. Understanding how individuals and communities related to the landscape before the event, what activities they engaged in and what values they attached to the landscape is also a critical factor (EDGELEY & PAVEGLIO, 2017). Our findings reveal the importance of certain practices (in our case foraging) as indicators for how groups and individuals may reconnect with the landscape. Local long-term inhabitants with strong connections to the landscape are more likely to be considered when discussions turn to (re)connection to the landscape. However, the loss for individuals with distant possible idyllic memories and connections should not be trivialised, as their whole memory of a place may be impacted.

#### Author contribution statement

Andrew Butler: Conceptualization, Methodology, Writing – original draft, Writing – review & editing, Investigation; Elin Ångman: Methodology, Investigation; Åsa Ode Sang: Methodology, Software; Ingrid Sarlöv-Herlin: Project administration; Ann Åkerskog: Conceptualization, Validation; Igor Knez: Formal analysis, Conceptualization.

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