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Reaffirming sensory ethnography: sensing regenerative tourist practices in dark-sky protected zones

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ABSTRACT

This paper affirms the importance of ethnography as a mechanism for identifying regenerative practices in tourism research through exploring a dark-sky destination. National parks in the United Kingdom have initiated leisure-based festivals to raise ecological awareness and preserve protected dark-sky reserves. Yet, scholars have paid little attention to how public engagement in dark-sky festivals can raise ecological awareness of light pollution, the climate crisis, and sustainability issues, and none have explored the regenerative potential that this research addresses. To understand the impact of dark-sky tourism in protected areas, a novel theoretical approach combines Sarah Pink's (2009) conceptualisation of emplaced sensory ethnography with theories of regenerative tourism. Conducted during the North York Moors National Park Dark Skies Festival in February 2024, the research employed emplaced sensory ethnography to capture the sensory perceptions and practices of dark-sky tourism stakeholders. The study offers new insights into how dark-sky festivals engender sustainable practices among stakeholders through co-produced, emplaced sensory experiences in dark-sky reserves.

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Introduction

Light pollution has significantly harmed the night sky and all living things (Foott, 2022). In the USA and Europe, 90% of citizens live under light-polluted skies, with only 1% of this light considered beneficial (Foott, 2022). While there is a growing movement to protect dark-skies and raise awareness of conservation efforts (DarkSky International, 2024), our understanding of their effectiveness is limited (MacMillan et al., 2023). Additionally, there is a gap in social, environmental, and cultural knowledge regarding the impacts of light pollution and dark-sky reserves, particularly in relation to tourist perceptions (Hvenegaard & Banack, 2024). Moreover, MacMillan et al. (2023) call for scholars to explore how dark-sky public engagement, like festivals, facilitates reciprocity for nocturnal ecosystems.

The North York Moors National Park (NYMNP), United Kingdom (UK), is one of twenty-two internationally recognised dark-sky reserves. To raise stakeholder awareness

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and engagement in dark-sky conservation, NYMNP has established regenerative tourism and dark-sky public programmes (Galvin, 2024). However, the practical application of regenerative tourism remains unexplored and unproven. The experiential nature of festivals necessitates a new approach to develop dialogue with tourism stakeholders. Although researchers such as Dunn and Edensor (2023) have examined the experiential aspects of dark-sky activities, there is a lack of research on how sensory experiences at dark-sky festivals contribute to sustainable outcomes. Scholars such as Ivanova et al. (2021) advocate for creative and disruptive multisensory methodologies to understand the complexity of situated tourism relations.

Drawing upon Sarah Pink's (2009) concept of emplacement, which emphasises the connections between mind, body, and environment, this study explores how sensory engagement with natural darkness contributes to a new epistemic understanding of dark-sky ecologies. By investigating the experiences of stakeholders (visitors, businesses, and public officials) during the 2024 NYMNP Dark Skies Festival, the study examined the interplay between emplaced sensory experiences and external socio-ecological factors, such as the climate crisis, to explore how public engagement can enhance awareness of nature conservation goals in national parks. As such, we conceptualise emplaced sensory ethnography as a regenerative way to explore the ecological inter-relationships and interconnections between human and non-human entities.

Such methodologies are underexplored in dark-sky tourism, and none utilise emplaced sensory ethnography to investigate whether dark-sky tourism can produce regenerative conservation outcomes. To address this gap, this paper examines how emplaced sensory perceptions, when immersed in public engagement programmes like dark-sky festivals, can enhance ecological awareness of the climate crisis and its effects in protected dark-sky places. Underpinned by deep reflexivity (Crossley, 2021), the research critically examines how emplaced sensory ethnography builds stronger human and non-human connections within naturally dark places.

We argue that such approaches hold significant potential for tourism scholarship, particularly in terms of how data is elicited and operationalised. The paper aims to deepen the understanding of the benefits of emplaced sensory ethnography in explicating the impacts of regenerative tourism in qualitative research. Crucially, it points to an ontology of dark-sky posthuman nature relations and how festivals can mobilise stakeholders to take collective responsibility to tackle light pollution and the climate crisis.

Literature review

Dark-sky places and regenerative tourism

For Franklin (2014, p. 248), the negotiation of material relationships between human and nonhuman actors "should never of course be privileged over the action of the world it connects to," and leisure should be considered a "multispecies practice" (Danby et al., 2019, p. 291). Moving away from human-centric practices in tourism recognises a shared socio-ecological responsibility that upholds justice in tourism. The climate crisis, human rights, and ethics are increasingly central to tourism and leisure studies, as highlighted by scholars like Chakraborty (2021), who problematises anthropocentrism in

tourism by exploring the production of nonhuman knowledge in unspoken natural World Heritage sites. Critical to this research is a recognition that understanding human relationships with nonhuman species and biodiversity is integral to our societal well-being (Danby et al., 2019). Crises such as pandemics, wars, climate emergencies, and natural disasters have demonstrated the vulnerability of tourism destinations (Higgins-Desbiolles, 2020). In response to calls that sustainable tourism has failed to deliver responsible approaches to tourism, there is a turn to regenerative approaches in tourism (Dredge, 2022). Regenerative tourism draws from a range of ecological perspectives and worldviews that recognise human and nonhuman actors playing an equal role in restoring and regenerating tourism destinations (Bellato et al., 2023; Pollock, 2019).

Regenerative tourism is viewed as crucial for addressing environmental concerns (Paddison & Hall, 2024; Pollock, 2019). Unlike sustainable tourism, which focuses on minimising harm, regenerative tourism actively restores and enhances the environment (Becken & Kaur, 2021; Duxbury et al., 2020) and provides an alternative to extractive tourism (Hussain, 2021). Pollock (2019) suggests that simply doing less harm is insufficient to mitigate the impacts of tourism. This approach understands the visitor economy and destinations as interconnected living systems governed by natural principles. Regenerative tourism integrates local community practices and ecological processes to enhance the well-being of all human and nonhuman entities (Bellato et al., 2023). However, challenges like organisational logistics and destination management persist (Hussain, 2021).

Arguably, in dark-sky conservation, regenerative tourism is especially valuable because it shifts the focus from merely maintaining dark skies to actively restoring them, particularly in national parks (Galvin, 2024). Although there is no universally agreed-upon definition for regenerative tourism, Bellato et al. (2023) promote the transformative power of regenerative actions that aim to restore ecosystems holistically, allowing communities to prosper. By recognising the complexity of balancing human and nonhuman elements as a single living system, regenerative tourism strives to involve stakeholders in developing long-term, environmentally friendly practices and behaviours (see Bellato et al., 2023; Mang & Haggard, 2016). However, such an approach based on specific places necessitates a shift in thinking from individualism to a collective perspective that considers the environment holistically, through adopting a collaborative approach to managing places (Dredge, 2022).

The demand for dark-sky tourism is growing, with an increase in leisure, educational, and conservation-focused activities in protected nighttime environments (Blundell et al., 2020). These activities enable visitors to appreciate natural darkness and celestial phenomena while promoting ecological awareness (Barbosa et al., 2022; MacMillan et al., 2023). Key forms of dark-sky tourism include stargazing, guided astronomy tours, nocturnal wildlife experiences, night walks, and cultural engagements through art and music (Derrien & Stokowski, 2020). Dark-sky parks are officially designated for their exceptional sky quality and offer a range of activities, including self-guided stargazing and educational programs. In contrast, dark-sky events and festivals are temporary and feature expert-led workshops and community engagement (Hvenegaard & Banack, 2024).

Whilst, research exists that examines the experiential qualities of communities and practices (Dunn & Edensor, 2023) and leisure engagement in dark-skies places such as astrotourism involving citizen science projects, cycling and night walks (Barbosa

et al., 2022; Beeco et al., 2011; Cook & Edensor, 2017; Mace & McDaniel, 2013; MacMillan et al., 2023; Rodrigues & Loureiro, 2022), few have explored visitor experiences (Derrien & Stokowski, 2020) in national park dark-sky places, and dark-sky festivals (Breukel & Cieraad, 2024; Hvenegaard & Banack, 2024), and none have explored how sensory experiences of dark-sky festivals can lead to achieving ecological awareness and regenerative outcomes. Such research requires a situated approach that relates to the rights of all living creatures and natural entities, and thus a methodology, such as ethnography that explores non-verbal worlds.

Emplaced sensory ethnography

Tourism ethnography has expanded beyond its anthropological roots to encompass various approaches, offering numerous possibilities (Andrews et al., 2019). Traditionally, ethnography involves prolonged fieldwork, utilising methods such as participant observation, interviews, co-production, and visual techniques, including film and photography (Howes, 2005). Modern tourism ethnography often emphasises experiential, co-produced, and reflexive research, providing both theoretical and practical insights (Pink, 2009). This involves immersive engagement with people in their daily environments, revealing nuanced sensory and experiential insights (Ingold, 2000). Reflexive analysis considers social, political, environmental, and historical contexts to understand the interactions between humans and their environment (Vergunst & Ingold, 2008).

When exploring unspoken sensory worlds, Howes (2005) advocates for an anthropology of the senses, emphasising that sensory experiences are shaped by personal history and cultural practices, yet are often overlooked and hard for participants to articulate (Crang, 2006; Crang & Cook, 2007). While sight and hearing are traditionally prioritised, scholars argue that a broader sensory environment is essential to understanding the embodied experience (Ivanova et al., 2021).

Sarah Pink's (2009) *Doing Sensory Ethnography* encourages researchers to engage all senses to understand how bodies interact with spaces and places, such as in tourism. She defines sensory ethnography as a means to grasp the "multisensoriality of experience, perception, knowing and practice" (Pink, 2009, p. 1). This multisensoriality encompasses individual sensory modalities (sight, sound, taste, smell, and touch) and their interconnectedness, resulting in "knowing as you go" and producing emplaced bodily knowledge (Ingold, 2000, p. 228). Pink's (2009) work emphasises the relationship between mind-body-environment in shaping space and place.

The emplaced sensory ethnographer adopts a co-productive participant-observer role, engaging sensorially in shared environments and practices (Pink, 2009), which allows researchers to gain deeper insights into experiences of participants, offering an alternative avenue to ethnographic knowledge. It highlights a participatory approach to understanding the often-overlooked emotional biographies of participants, with reflexivity at the core of the process (Crang & Cook, 2007). A growing body of scholars has engaged in sensory ethnography to explore human and nonhuman interactions within the natural environment (Markuksela & Valtonen, 2019), as well as issues related to the climate crisis and sustainability through sensory experiences of melting glaciers and fishing (Gagné, 2024; Nadegger & Porzionato, 2025; Waitt et al., 2021). Sensory ethnography requires the research to adopted reflexivity when researching participants experiences.

Reflexivity and emplaced sensory ethnography

Emplaced sensory ethnography is grounded in continuous reflexive analysis, which draws on the experiences of both research participants' and researchers throughout the research process (Adams, 2025). Using creative, disruptive methods like deep reflexivity can help researchers challenge traditional ways of producing tourism knowledge (Ivanova et al., 2021, p. 2). Reflexivity helps appreciate embodied sensation of being-with environments and the connections and interactions between human and nonhuman actors. Saldanha (2002) describes diverse sensory experiences in rave tourism, including music, sweat, kerosene smell, humidity, and the sensation of sand underfoot, as well as the effects of drugs that amplify sensations. Conversely, Mourtazina (2020) depicts Buddhist retreat tourism as a silent landscape, emphasising the lack of sound. Edensor and Falconer (2011) show how darkness heightens sensory experiences and addresses fears of the dark. Adams (2025) notes the increasing focus on affect and emotion in sensory ethnography, suggesting emotional states can reveal social justice issues (Hall & Brown, 2022) and environmental crises in tourism (Viken & Heimtun, 2024).

The lack of reflexive consideration of researchers' bodies in qualitative research is emphasised by Ellingson (2017), who encourages scholars to share their embodied experiences. Reflexive accounts can reveal the emotional impact of fieldwork (Knudsen & Stage, 2015) and the politicised nature of knowledge production (Ivanova et al., 2021), which helps researchers reflexively understand themselves alongside participants' experiences (Kusenbach, 2004). Scholars advocate for ongoing, deep reflexivity, where fieldwork and writing are closely linked (Crossley, 2021). This concept, described by Blackman and Commane (2012, pp. 229–231) as "double reflexivity," enables researchers to engage with their experiences and show commitment in both fieldwork and writing. Central to conducting emplaced sensory ethnographic research is the requirement for researchers to engage in an ongoing process of reflexivity to explicate sensory and emotional experiences (Pocock, 2015). This longitudinal approach allows researchers to revisit data and explore new questions, extending reflexivity beyond their immediate experiences in sensory ethnography (Figure 1).

Emplaced sensory ethnography and regenerative tourism

We argue that emplaced sensory ethnography offers a critical posthumanist approach for exploring non-verbal and nonhuman material worlds, such as nocturnal landscapes, and provides a holistic understanding of how sensory immersion in natural darkness leads to new ways of *being* and perceiving the world (Ingold, 2000). Through bodily adaptation to natural darkness, a greater sense of empathy between human and nonhuman beings can be achieved by engaging through underused senses, emotions, and practices. We contend that recognising these practices highlights a significant approach to understanding how connections to nature materialise. Conceptualising dark-sky tourism regeneratively requires a holistic ecological framework for investigating why the dark matters to stakeholders. Emplaced sensory ethnography creates such a framework. Understanding how public engagement generates ecological awareness and action could highlight regenerative ways to engage tourism stakeholders in sensitive environments and encourage pro-environmental behaviours. We argue

Figure 1. Dark-sky observatory. Photo credit, Author's own, 2024.

that learning about how bodies connect to nature is regenerative, producing sensations of well-being, empathy, and a commitment to conservation.

By analysing dark-sky festival stakeholders through an emplaced sensory lens, this paper offers scholars in tourism and leisure a novel ethnographic approach for understanding how *in situ* non-verbal forms of knowledge are generated. Moreover, emplaced sensory ethnographies offer a novel and rich approach that encourages the acknowledgement and exploration of the duality and intimacy of being embedded in the empirical subjective nature of fieldwork (Crossley, 2021).

In sum, this research draws on a small but growing body of posthumanist tourism scholarship that aims to rebalance the importance of nonhuman beings, both animate and inanimate, with human beings to address environmental inequalities (Danby et al., 2019; Dashper, 2020; Franklin, 2014; Prince, 2019) arising from issues like light pollution. We ask how dark sky tourism can be regenerative for dark-sky places by sensitising bodies to natural environments.

Methodology

Case study

In the UK, government agencies are beginning to adopt regenerative tourism as a restorative approach to addressing sustainability issues, with a focus on reviving tourism resources sustainably (Higgins-Desbiolles, 2020). Public authorities in the UK, including national parks, have turned to regenerative tourism to address the impact of the climate crisis. National parks have redefined sustainable tourism as a critical means to achieve their statutory purpose and duty through a regenerative tourism approach that will help to "generate 'net-positive' impacts in carbon reduction and biodiversity, as well as enhancing the vitality and integrity of host communities" (Galvin, 2024). National parks recognise that tourism development needs to move

from "doing less harm" to "helping give back more than it takes" (Galvin, 2024). To appreciate the early impacts of regenerative tourism in national parks, our research examines how public leisure engagement activities, such as dark-sky festivals, generate social and environmental benefits.

The Dark-Skies Festival in NYMNP has evolved from being a tourism product to counter seasonality in the shoulder months of early winter and spring to become a vital tool for raising awareness of the impact of light pollution. Local businesses offer a variety of activities aimed at promoting dark-sky leisure, and the festival has grown significantly over the last decade, with visitor numbers growing by 83%, businesses hosting events by 87%, and the number of events by 76% (P. Smith, personal communication, 13 March, 2025). The NYMNP deliver two iterations of the Dark-Skies Festival each year in partnership with the neighbouring Yorkshire Dales National Park. Although NYMNP offers in-house events, the festival is primarily delivered by local businesses, with NYMNP acting as the umbrella organisation. NYMNP offers dedicated web pages for tourism businesses to advertise their events.

Methodologically, the research was designed to capture the experiences, ideas, and interconnectedness among the research participants, researchers, and the environment, to appreciate the complexity of being a tourism stakeholder in a dark-sky reserve (Pink, 2009). Developing a visual methodological approach using emplaced sensory ethnography enabled research participants and the researchers to sense, express, and share their beliefs, attitudes, and sentiments while examining the social, environmental, and political relationships that research participants formed (Henley, 2020). Taking an emplaced multi-sited approach through methods such as film facilitated an exploration of the situated experiences of tourism stakeholders. The research design included a professional filmmaker and emplaced sensory ethnographers to film high-quality semi-structured interviews, showcasing participants' experiences at a dark-sky festival to a broader audience. A 9.5-min film was produced, screened at four academic conferences in 2024, and is available on YouTube. The film was shown at the 2025 Dark-Sky Festival to gather stakeholder feedback and facilitate ongoing reflexive analysis.

Research participants

Research participants included five different tourism businesses (eight individuals), two public officials from NYMNP and ninety-four visitors attending the events. The research team contacted and attended five independent events run by five different local businesses (over three days) that included two moorland walks, one forest star gazing event, one observatory indoor event (due to weather), and a moorland walk with a silent disco, in February 2024 (Table 1).

Walking methods: go-along

Engaging with research participants through participatory methods, such as the go-along or walk-along (Kusenbach, 2003), allows researchers to co-produce empirical data and enhances their understanding of participants' experiences (Crouch, 2000, p. 68). The go-along method is spatial and focuses on the "doing of mobility," creating meaningful spaces (Spinney, 2015, p. 232).

Table 1. Research participants (Authors own, 2024).

Participant	Description
B1.1	*Sole Trader x 1
V1.1 – V1.24	24 Visitors
B2.1 & B2.2	Sole Traders x 2
V2.1 – V2.14	14 Visitors
B3.1	Sole Trader x 1
V3.1 – V3.18	18 Visitors
B4.1 & B4.2	Small Business x 2 owners
V4.1 – V4.24	24 Visitors
B5.1 & B5.2	Sole Traders x 2
V5.1 – V 5.14	14 Visitors
PO1	Public Official
PO2	Public Official

*A sole trader is a self-employed individual who owns and runs a business alone.

By co-producing the act of walking, researchers gain unique and detailed insights into participants' lives. This process engenders "ethnographic intimacy," where researchers and participants share personal narratives (Frohlick & Harrison, 2008, p. 16). Sharing similar cultural and social characteristics, including a love of nature, researchers can reflect critically on their positionality and how it influences data collection and analysis. The aim was to prioritise participants' sensory experiences to develop a richer understanding of their lived realities.

The GoPro films enabled the researchers to document their embodied experiences, capturing firsthand perspectives of movement, sensory engagement, and interactions within a given environment. The GoPro footage captured how the researcher and study participants navigated dark spaces, their visual and auditory experiences, and their emotional responses to the nighttime landscape. This method provided immersive, first-person documentation, allowing for a richer analysis of how the researcher and participants experienced the darkness, whether through awe, discomfort, or heightened sensory awareness. It also revealed subtle, often-overlooked aspects of dark-sky tourism, such as how bodies adjust to low-light conditions and how tourists interact *with* the environment.

Using body-mounted GoPro Hero9 cameras instead of head cameras was less intrusive and allowed for normal movement, and at times, a loss of awareness that the camera was present. The researchers captured footage ranging from 90 to 240 min during each event. Filming often presented technical challenges, including maintaining battery life in cold temperatures and experiencing reduced sound quality due to windy conditions. Despite these challenges, video and sound recordings collected in the field exceeded what was anticipated (over eight hours of footage). The go-along involved co-producing each festival event (three to four hours) with different visitors and tourism businesses at five separate events, between 6:30 pm and 1 am.

The go-along facilitated a prolonged, in-depth opportunity to co-produce and observe verbal, non-verbal, and taken-for-granted experiences with the research participants (Kusenbach, 2003). The researchers conducted twelve semi-structured mobile participant interviews (one to five minutes) with the professional filmmaker. Participants were randomly invited to interviews during star-gazing events and walks to share their experiences while participating in the activity. Topics focused on feelings, emotions, and sensations, both physical and intangible, such as wellbeing, awe, and experiencing the elements of ground, air, temperature, and darkness. This was followed

by writing reflexive post hoc field notes. Deep reflexivity facilitated the investigation by systematically recording the practices undertaken in field notes at the end of each day (Crossley, 2021). Through this process, the researchers identified how they and participants engaged with sensory skills they rarely used, such as walking in silence and darkness without artificial light.

Fieldwork and analysis were triangulated, iterative and utilised an integrated reflexive process, informing subsequent field research encounters. Key moments identified through situated reflexivity facilitated the identification of topics and questions concerning relational practice, emotions, sensations, skills, and values. This was conducted by replaying GoPro films and interviews immediately after the fieldwork, which informed deeper-level questioning in subsequent field research sessions. This triangulation was crucial to the fieldwork and trustworthiness during the write-up, demonstrating commitment to the process by returning to the field and recalling the "imaginary" dark-sky experience when watching video data and re-reading field notes (Blackman & Commane, 2012, p. 229). For example, watching the recorded video data (between fieldwork days) enabled the identification of sensory practices, such as "looking up at the sky and appreciating how natural moonlight creates different sensory responses to movement and feeling the ground through touch" (field note, 26 February 2024—see Figure 2). Such practices became an active line of inquiry in subsequent festival events (discussed later).

Ethics

Following ethical approval that considered risk, safeguarding, and gatekeepers, each tourism business was contacted and provided informed consent for the research team (two film ethnographers and one filmmaker) to attend their festival event. The businesses informed visitors in advance of the event, and at the beginning of the event,

Figure 2. Reflective analysis in situ. Photo credit, Author's own, 2024.

the researchers briefed all participants to secure informed consent and filming rights. Follow-up emails were sent to all participants by the tourism businesses after the event.

Data analysis

Identifying key thematic findings (Braun & Clarke, 2006) relied on reflexive analysis triangulated through NVivo 12+ cross-referencing data from field notes, semi-structured interviews, and film footage. Twenty-three codes, such as ecological awareness, climate anxiety and loss, health and well-being, practices and skills, and access and education, were grouped into categories and themes such as regenerative action, responsibility, awareness, education and behavioural change (see Appendix 1). The go-along method facilitated a more naturalistic discourse between human and non-human bodies, providing unique access to sensory biographies, social positioning, spatial intensities, and social realms (Kusenbach, 2003). For instance, participants sensed the need for adaptations when transitioning from daylight to darkness. They felt how their bodies adapted to the loss of natural daylight, which negated the need for artificial light to walk in natural darkness—sensations that many had not experienced before. These sensory insights were recorded in field notes and reimagined during film analysis, ensuring the trustworthiness of the findings when identifying the emergence of dark-sky practices and skills development.

Reflecting on data and field notes throughout the research process enabled researchers to understand their emotions and sensory responses, highlighting the benefits and challenges of this approach in the context of dark-sky tourism. In summary, the paper aims to identify how emplaced deep reflexivity highlighted key findings regarding ecological awareness and regenerative practices, and how it informed the entire research process, from inception to engagement with the research imaginary (Blackman & Commane, 2012; Pink, 2009).

Findings and discussion

What follows is a reflexive analysis that highlights how bodily practices adapted and changed in nocturnal spaces, thereby raising ecological awareness and, in some cases, prompting practical environmental action. Importantly, the reflexive research process was not chronological but interchanged and evolved throughout the project. Two themes are considered: firstly, how public engagement led to changed perceptions and increased ecological awareness, and secondly, how this resulted in regenerative environmental action. The two themes are evidenced through three practices: those that explore walking in silence, walking-*with*-darkness, and how sensory engagement builds awareness and connectivity with nocturnal ecologies.

Affirming emplaced sensory ethnography in tourism: silent practices

Being immersed in a dark-sky destination allowed visitors to experience natural darkness, fostering a connection between the human and non-human worlds. This experience encouraged participants to "tune into the environment through some silent walking" (B5.1). As they walked quietly together, both research participants and

researchers forged connections between the mind, body, and environment, creating sensory experiences that would typically be overshadowed by our tendency to illuminate the night artificially.

For instance, one participant noted that walking in the dark heightened their awareness of their surroundings. They remarked, "everything is multiplied much more like that little stream that we pass, you will not notice that during the day because it's night and everything else is quiet. You hear this little rustling and you think crikey, it's a torrent and it's just a little tiny stream (B3)." In this silence, participants could connect more deeply with their other senses, such as sound, which became an important tool for navigating the environment.

This evidence shows how practising silence fosters ecological awareness, especially at night when verbal and visual stimuli are minimised. This awareness developed during walking events, where participants engaged in reflective practices through silent walking (fieldnotes 23 & 24 February 2024). Practising silence encouraged researchers and participants to experience night vision, touch, sound, and smell, which built proprioceptive awareness of how bodies move at night, in tandem with social and cultural understandings of how darkness evokes emotional responses, such as fear, anxiety, relief, enjoyment, and excitement. These sensory practices and experiences occurred whether participants were indoors or outdoors, highlighting the importance of silent spaces regenerating a connection to nocturnal ecologies. At the Sutton Bank Observatory, one participant reflected that "there's like blackness and suddenly this galaxy comes through that was fascinating because, in a book, you can't get that, but I felt like I was really being transported through the Milky Way and beyond" (V1.1).

Capturing a dark-sky walk or stargazing activity on film combined with reflexive analysis produced compelling evidence of how silent, non-verbal, and mundane moments were often the most significant. Silence was invoked in several ways: involuntarily by navigating rough paths and terrain in darkness that required deep concentration, by the weather conditions, or by consciously engaging in silence both voluntarily and through the invitation of the walk leaders. For example, one walk leader described how "we're just going to have a few moments of silence. While we're walking, have a look at what you can see in the torchlight, noticing shapes, colours, everything" (B2.1). Silent practices sensitised bodies to being *with* natural darkness, regenerating a connection and empathy with nature.

Researchers and visitors practiced silence to connect with their environment (see Figure 3) deeply. In the West, silence is rare and can reveal hidden worlds (MacKendrick, 2001). Our film demonstrated how silence enabled participants to engage with sensory inputs that verbal and visual distractions often obscure. The walk leader helped them attune to their surroundings, transforming everyday experiences like rain on vegetation through physical interaction, empowering a deep interconnection between self-ecology-movement (GoPro Film Data, 23 February 2024). Film data captured how participants' curiosity was heightened during silent practice, where they actively listened to and touched the rain on leaves, and felt the patterns and shapes produced by the stars, engaging their senses in different ways to experience dark-sky places (GoPro Film Data, 23 February 2024). This built a sensory knowledge and regenerative connections that encouraged reflection and profound appreciation of the participants place in a nocturnal world: "It gives me existential thoughts as well; it makes me

Figure 3. Walking in silence, Photo credit, Authors own 2024.

think about the daily worries of life, and work, because we're not even a speck of dust in the whole universe" (V1.1). *In situ*, reflections produced a sense of well-being expressed by the comment, "we're all carried away in our little heads in thinking about, and we're getting worried about little things. Most of these things don't matter. So, it gives you a different perspective. It's very humbling" (V1.1). Practising silence enabled deep processes of existential reflexivity. Silently emplaced within dark-sky places created space to appreciate a broader range of sensory inputs like sound, touch and proprioceptive encounters through walking on challenging terrain. Reflexively, we co-produced an emotional connection with the environment by noticing what might be considered mundane in diurnal settings, a dog barking or the noise of the wind in the trees. Notably, the emplaced silent practices regenerated sensory bodily skills, which in turn built ecological awareness (fieldnote, 23 February 2024).

Affirming sensory emplacement in tourism: walking with dark-skies

During two walks that involved navigating challenging terrain, researchers and participants co-produced the experience of mud in darkness, evoking tactile sensuality, contrasting with feelings of horror associated with falling into deep, sloppy, "cow-churned" mud. Temporarily adopting the role of walk leader, one researcher helped participants build proprioceptive knowledge to navigate this terrain that facilitated a bond of trust between researchers and participants and a more naturalistic interaction (fieldnote, 24 February 2024). Reflecting on this aspect of the walk through the GoPro film data, we appreciated how inexperienced and difficult many participants found walking at night. We engaged in humour that played a crucial role in helping participants overcome obstacles by alleviating the initial stress of getting immersed and falling into the mud. This humour regenerated feelings of childhood enjoyment and playfulness, making the experience of mud seem fun. Although these

experiences were mundane, they were crucial in regenerating stronger connections with the environment by demonstrating the practice of navigating rugged terrain. Initial fears of walking at night were alleviated by learning new skills, and it was identified that taken-for-granted practices for experienced walkers were key milestones for less experienced participants.

Tourism businesses appreciated the importance of this, demonstrated by helping visitors mobilise different, little-used, visual skills such as engaging natural night vision. Practising natural night vision heightened physical experiences of walking *within* nighttime places. For example, to prepare for walking in the dark, the walk leaders advised, "before you start walking, just allow your eyes to get used to the dark" and "really feel into your feet" (B2.1). When visibility was limited to a few feet in front of participants and at times absent, we observed how walking became a radically different experience (GoPro Data, 24 February 2024). The participants' initial response was to illuminate the ground artificially, and it took the walk leaders some considerable effort to encourage the group to switch off torches. This involved educating the group about different kinds of light, pointing out that "we do have red lights, and that interferes with our night vision much less than white light." Good forms of artificial light were contextualised, and the need to "do a short stretch without our torches" was explained as a process for developing new skills. As one respondent described,

> it takes twenty minutes to let your eyes adjust to night vision. In this moment […], we're not seeing colour anymore, our prime sense for many of us is our sight. When we get to pitch black, other senses start to run (B2.1).

The opportunity to experience the outdoors on rough tracks and paths in the darkness created a connection between participants and the environment, which produced significant enjoyment because "even if they can't see the stars, they just enjoy walking in the dark" (B.3). During a moorland walk to participate in a silent disco (see Figures 4 and 5), most participants found that natural light from a full moon meant they did not need to use artificial light, and experienced night vision for the first time. For one participant, the experience of walking along the coastline and beach at night fulfilled a long-term ambition. For her, walking without artificial light produced intimacy *with* the environment and sensorially attuned her body to new practices of movement (fieldnote 23 February 2024). The walk leaders periodically offer ways to connect with the environment, stopping the group and directing them on ways to experience the night environment. As one event leader commented, "I want you to start to notice sounds that you can hear, the quality of it, and what direction is it coming from" (B2.2). Another walk leader described how, "when we're busy talking, what we do is we don't notice the miracle that's actually happening." She explained how silence helps us "to look closer at things because it actually makes me feel [the cosmos is] much, much bigger than just ourselves." As we walked, she described the experience of leading as "a sensory meander," which enabled

> that opening up to the senses of relating to the present moment, and […] your mind isn't worrying so much about the future or thinking about the past, it's very much in the here and now, which means that you are much more open to […] deeper experience of life […and] connecting with this amazing [cosmos] (B2.1).

Figure 4. Walking with dark-skies, Photo credit, Authors own, 2024.

Figure 5. Dancing under dark-skies premier. Photo credit, Authors own, 2024.

Participants recognised the importance of making different kinds of physical connections with dark-sky places and reflected that "it kind of takes yourself out of your routine of the same walk that you do as well" (V.3.5). The connection between the groups became more collaborative, both verbally and physically assisting each other to navigate obstacles that only presented themselves in the immediacy of a dark terrain (fieldnote 24 February 2024). Conscious of these newly acquired skills, the walk leaders guided participants with proprioceptive instructions: "as you're walking, if you consciously pick your feet up and place them so, we might walk a little bit

slower so that you can feel the ground and feel what it's like to walk in the dark" (B5.3). Unlike a walk in daylight, the mind could not wander but was transfixed on making careful and accurate movements to avoid hazards (fieldnote 23 & 24 February 2024). Reflecting on film data, we identified how our bodies became sonically attuned to the movement of water in streams, wind in vegetation and the sounds of nocturnal animals, these becoming signals for the body to sense and connect with the environment (Go Pro Film Data 23 February 2024). While walking past a field of sheep by the coast, one participant was startled by the reflection of her torch in the sheep's eyes. She had not experienced the feeling of many pairs of disembodied eyes staring back, noting, "It's funny when you see them in the fields, and you shine your torch on them, and you get all these eyes looking back at you" (B2.7). This led to a humorous conversation about where sheep slept at night and a genuine surprise that they stayed outdoors in the fields or moorland (fieldnote 23 February 2024). This evidenced how powerfully a dark-sky walk was for reconnecting participants with nocturnal rural and natural environments. Sensory emplacement generated reflection on our understanding of both human and non-human nocturnal ecologies and regenerative through creating awareness and feelings of connectedness.

Affirming emplaced sensory ethnography in dark-sky tourism: developing ecological awareness and regenerative action

Both the NYMNP and the tourism business providers recognised that immersing visitors in dark-sky experiences was crucial for delivering a call to action to conserve nocturnal biodiversity.

> When we first started, the objective was mainly around tourism and benefits to the rural economy. A lot more of our work is about conserving dark-skies and conserving nocturnal habitats. What I think the ultimate aim is that when people come to an event, they take away a message, maybe something that fundamentally changes their behaviour. Whether that's turning the lights off or changing the lights to be dark-sky friendly (PO1).

Regardless of the type of event, most visitors were experiencing a dark-sky leisure event for the first time. As one respondent reflected,

> it's just nice to have this freedom: we didn't even know we could just come out on an evening and do a walk and see what the countryside looks like in the dark, which is completely different to the day. You wouldn't recognise it as the same place as in the day (V2.5).

As researchers, co-producing events with visitors to the dark-sky reserve enabled an in-depth exploration of participants' often limited experiences of light pollution, particularly regarding the impact on non-human inhabitants. Reflexively analysing participants' experiences throughout the research process, from initial design to write-up, the researchers analysed the different roles they adopted, acting as a walking guide in one instance or as an experienced walker or learner. As co-walkers, during one moorland walk we discussed the transition from dusk to darkness, observing the transition from diurnal birdsong to nighttime animal and bird sounds, along with the gradual fading of colour, where trees that had blended into a cacophony of colours now became pronounced silhouettes (fieldnote, 24 February 2024), one participant

reflected, "so it's like connecting to things, that takes you out of your everyday [life] (V3.4)." The recognition of building that connection with nature at different times of day featured significantly, "even just […] sitting outside at ten at night and looking up at the sky. You're just feeling connected to things in a different way (V2.4)." This *in situ* reflection produced a contemplative atmosphere and philosophical discussion on how being immersed in darkness produced a sense of "grounding," of being *with* the environment, which raised the participants' and researchers' ecological awareness of the importance of being emplaced in dark-sky places for planetary well-being (fieldnote, 24 February 2024). Further reflexive analysis of the Go-Pro film of this moment identified the importance of this change in the atmosphere produced by walking in darkness; our emplaced sensory awareness of being *with* the nocturnal world heightened our ecological awareness (Go-Pro Film, 24 February 2024).

Participants discovered their bodies' ability to adapt to darkness and develop night vision, something many had never experienced. Excited by this skill, they began walking without artificial light and enjoyed the sensation of moving in the dark. Participants acknowledged an of appreciation the loss of skills that had once been prevalent in everyday life, as one participant reflected, "you just don't tend to be on the coast when it's dark" (V.2.2). The sense of loss and reclaiming of this connection was palpable, evidencing the importance of being emplaced as researchers and participants within dark-sky places (fieldnote, 23 February 2024). This is evidence of the regenerative potential of building connections to nature for raising awareness of not just the environmental but also the cultural importance of conserving natural darkness.

Lack of access was repeatedly expressed, as one participant shared, "I know about the festival now. I had no idea about it before, so it's pretty good to raise awareness, especially on light pollution" (V1.1). Our research evidenced that dark-sky festivals act as a regenerative catalyst for engaging and raising business and visitor stakeholders' awareness of the ecological crisis of light pollution, as one participant reflected, "it's fantastic to see the stars without [light pollution] we live in York [United Kingdom], so there's loads of light pollution you never really get to see the stars. So, to come out here, it was fantastic just to see [dark-skies] like this" (V2.5). Through enabling deep sensory connection to dark-sky environments *via* the practices of silence, walking and experiencing natural darkness, participants appreciated and felt a greater connection to nocturnal worlds. For example, in learning how to walk without artificial illumination, participants engaged in regenerative practices sensitive to nocturnal species' life rhythms, as one participant expressed how, "in the dark just for that […] moment of peace, and just to listen and tune in to this environment" (B5.1).

Participants felt a strong sense of loss for what once was as they experienced the dark sky and recognised the environmental impact of light pollution, as one participant described, "we come from a city, so we don't see anything like that. Very rarely will we get anything as glorious as this phenomenal clear night sky that's because of light pollution. So, the fact that we've had to drive over an hour and a half to come [for these] experiences just means obviously, we want to preserve that." They also described how "as a child, I'd see similar stuff from a city [and that] sort of thing and now we're doing whatever we can do to save things like this (V1.1)," evidencing participants awareness of the impact of light pollution and desire to restore natural darkness. Moreover, seeing the stars in their full glory highlighted the impact of dark-sky poverty: as one participant

described, "it just makes me think I need some time to process all that information. That's a bit overwhelming" (V.1.2). The festival was a powerful way to reflect on the enormity of the cosmos and the crisis light pollution poses, as one participant reflected, "it gives you a different perspective. It's very humbling it shows your power [and] place in the universe, we are nowhere and little things, little worries, little arguments you have with friends, it doesn't matter" (V1.2), demonstrating how sensorially emplaced experience regeneratively raised ecological awareness.

Emplaced ecological awareness led to a change in perceptions and behaviours, as one participant expressed, "we've been quite aware about it, and I'll be more careful about how I use light" (V1.2). The connection between becoming ecologically aware, building empathy, and taking regenerative action to preserve nocturnal ecologies was evidenced by one visitor stating, "we've started putting the lights on timers because I got interested in working the bat line. We did a bat survey recently, so we're very much engaging with that area" (V1.1). This evidences how the festival prompted active stewardship for conserving nocturnal biodiversity and tackling multi-species inequalities (fieldnote 17 February 2024).

The festival facilitates reflexive space for participants to connect and with "recognising that we are part of nature makes us […] appreciate the wonder of the way the world works […] connectedness isn't it, yeah, it's funny, I grew up in the middle of nowhere, […] like walking in the dark […] doesn't feel uncomfortable at all" (V2.5). We argue this demonstrates the effectiveness of the festival for delivering regenerative tourism experiences, evidenced by the ecological awareness generated through the practices participants experienced during the events. The call to action to preserve nighttime ecologies was demonstrated by participants' verbal and non-verbal interactions, as one business expressed, "I think at this stage is just about illuminating the subject. It's about raising it in a positive way. There are so many advantages of using white light more wisely you can have the convenience, and you can have dark-skies; you can have wildlife as well (B1)."

Tackling the anthropogenic impact of light pollution, however, was recognised as being in its infancy, as one tourism business and activist reflected, "there's no national legislation; […] what you […] have to do is on a grassroots level […] [and] educating people," further expressing that "we could do with strengthened law, but for the time being, we're gonna have to do this organically to convince people from the bottom that it's worthwhile changing behaviours" (B1). At the end of its first decade, the NYMNP is conscious that the festival is part of a wider conservation journey and has a long way to go to achieve ecological awareness that translates into significant regenerative action and ecological justice. For example, one public official reflected that the aim of NYMNP was for visitors to take away an ecological message,

> that fundamentally changes their behaviour I think the hope is that as a National Park, we have a reach well beyond our boundaries, almost a kind of systemic behavioural change in people (PO1).

Hopeful signs did emerge with a minority of visitors planning to educate others about light pollution following their experience at the dark-sky festival. For example, one participant described how their "neighbours have got a conservatory with their lights on, all night, pretty bright. and I'm going to try and say that 'you realise that

for the animals, for the bats […] could be quite bad for them. So maybe you could turn that off?' I should certainly be leaning on my neighbour" (V1.1). This evidence shows how dark-sky festivals and emplaced experiences of dark-sky places have the potential to mobilise regenerative action and behavioural change.

Conclusion

This paper aimed to reaffirm the value of sensory ethnography in dark-sky festival leisure spaces and tourism, more broadly. By adopting a novel methodological approach that applied sensory ethnography in nighttime locations, the research demonstrated how the sensory experiences of visitors to the NYMNP (re)generated ecological awareness. Critical to this was participants' emplaced experiences of dark-sky places through walking, dancing, and experiencing natural darkness and dark-sky environments. The interaction and interconnections facilitated by independent tourism businesses and visitors to the National Park enabled participants to experience new sensory practices, such as night vision, silence, and walking in darkness, that engaged a wider range of senses in understanding nocturnal ecologies. Emplaced deep engagement developed an ecological appreciation of the impact of light pollution, demonstrating that public engagement programmes like dark-sky festivals can catalyse climate awareness and, in some cases, active stewardship.

The significance of this research lies in providing a novel theoretical framework to examine how regenerative practices, skills, and actions materialise through a sensory ethnographic lens. Our theorisation highlights an ontology of dark-sky posthuman nature relations and how festivals can mobilise stakeholders to take small and realisable collective responsible actions to tackle light pollution and the climate crisis. This signals a novel way to explore the impact of regenerative tourism in action and an approach for regenerative tourism scholars to nuance the impact of regenerative tourism. Critically appraising the power of emplaced sensory field research affirms an approach to tourism and leisure ethnography that produces rich epistemological understandings of public engagement in the context of sustainable destination development. Making explicit the emplaced sensory ethnographic processes involved in analysis throughout the research process demonstrates how data was operationalised during and after its collection. This paper examines the complexity of research methods employed to comprehend the production of *in situ* non-verbal forms of knowledge. It proposes an emplaced sensory ethnographic approach that draws on ethnographic scholarship from across the social sciences.

Emplaced experiences that immerse bodies *with* natural dark places create reflexive space to appreciate how the senses are muted by everyday life and the importance of reclaiming sensory knowledge. Dark-sky festivals create opportunities for tourism stakeholders, such as dark-sky tourism businesses and visitors to National Parks, to engage, learn and build sensory knowledge that encourages regenerative tourism businesses, visitor practices and behaviours. Emplaced immersive experiences provide powerful posthumanist regenerative tools for national parks to mitigate the impact of light pollution and restore healthy ecosystems in protected zones. However, the scalability of this approach is limited to those who can afford to visit national parks.

Broader efforts are necessary to address light pollution and restore dark skies beyond protected areas, which contribute to the restoration of planetary health.

Building on these insights, there is a need and potential to improve regenerative tourism practices in the context of dark-sky tourism. This can be achieved through implementing dark-sky-friendly infrastructure, such as low-impact, dark-sky-compliant lighting (e.g., downward-facing, warm LED lights with motion sensors) to minimise light pollution. National parks and local authorities should introduce light pollution mitigation policies, such as designated "dark corridors" and lighting ordinances in surrounding communities. Opportunities exist to enhance sensory-based public engagement through guided night walks and silent night-time experiences that encourage deeper sensory awareness of natural darkness. Furthermore, workshops teaching visitors practical skills like night navigation without artificial light, star mapping, and deep listening to nocturnal wildlife could be impactful.

Encouraging regenerative tourism strategies that prioritise local ownership, employment, and training in dark-sky conservation and education would help develop pro-environmental behaviours beyond the festival. Designing pre- and post-visit engagement strategies, such as online resources, apps, or follow-up challenges that encourage sustained pro-environmental behaviour (e.g., reducing light pollution at home) and establishing "citizen science" projects where visitors contribute to long-term sky quality monitoring or nocturnal biodiversity studies would extend engagement.

While this research has its merits, several limitations should be noted. Firstly, data collection took place during the festival in February 2024 and is therefore limited in terms of both temporal and geographic scope. This represents a particular moment in time, and further research at different points throughout the year would help enhance the quality of the data collected and subsequent analysis. Also, further research that supports the ability to collect data across different environmental, cultural, and geographic contexts and varying time frames would be welcomed. Secondly, the sample may not be fully representative due to participant bias. Dark-sky festivals and events tend to attract those who have a pre-existing interest in dark-sky conservation, astronomy, and/or environmental conservation. This may result in a non-representative sample, as the views and experiences of respondents may not accurately reflect the broader opinions or attitudes. Further research that engages a wider range of respondents, including those who may not participate either by choice or due to potential barriers, would yield a more representative sample and provide more meaningful insights into the issues under consideration in this study.

We argue that emplaced sensory ethnographic research offers organisations, such as national parks, a way to conceptualise how public engagement programmes, like festivals, deliver critical messages concerning the climate crisis in protected zones. Importantly, emplaced sensory ethnography enabled the identification of rich and thick descriptions concerning critical changes in ecological awareness, practices and behaviours, which demonstrates how emplaced sensory ethnography in sustainable tourism and leisure research can offer in-depth, conceptual lens to explore how visitors interact with dark-sky environments. Moreover, national parks and tourism stakeholders should leverage emplaced sensory ethnography research to understand better

and refine public engagement initiatives, ensuring that dark-sky tourism contributes not only to sustainability but also to regenerative destination development.

This research shows that routes to *doing* regenerative tourism can be driven by subtle sensory experiences and immersive engagement in learning new skills and practices. The study demonstrates that emplaced sensory ethnographic methods in sustainable tourism research can lead to meaningful conclusions, which we argue would not have been so rich if an emplaced sensory ethnographic method had not been used. Walking in darkness is golden.

Author contributions

CRediT: **Jenny Hall**: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing; **Brendan Paddison**: Investigation, Writing – review & editing; **Bethan Jones**: Formal analysis, Writing – review & editing.

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Appendix 1. Dark Sky Coding.

Codes	Categories	Themes
Awareness Ecological/	Ecological Awareness	Awareness
The Climate Crisis Awareness/ Loss Anxiety	Responsibility	
Changing Behaviours/movement/downloading Apps/skills when walking/looking/sensing	Behavioural Adaptations Regenerative Adaptations	Behavioural Change
Changing Stakeholder Perceptions	Ecological Awareness Responsibility Regenerative Engagement	Awareness
Connecting With Nature/using the senses/ bodily knowledge/silence	Behavioural Adaptations Regenerative Engagement	Behavioural Change
Crime and Security	Fear Preventing Access Ecological Harm Educational Deficit	Education
Dark Sky Business	Behavioural Adaptations Regenerative Action	Behavioural Change
Dark Sky Places	Responsibility Education Regenerative Action	Awareness
Educational Engagement	Responsibility Changing Perceptions Ecological Awareness	Awareness
Enjoyment and Learning	Ecological Awareness Regenerative Adaptations	Awareness
Fear	Ecological Awareness Educational Deficit	Awareness
Health	Ecological Awareness	Awareness
Knowledge	Ecological Awareness Responsibility Regenerative Thinking	Awareness
Light Pollution Education	Responsibility Changing Perceptions Ecological Awareness	Awareness
Light Pollution Issues	Ecological Awareness Educational Deficit Ecological Harm	Awareness
National Parks	Regenerative Action Responsibility	Behavioural Change
Outdoor Access	Responsibility Changing Perceptions Ecological Awareness	Awareness
Physical Skills and Experiences	Regenerative Adaptations Ecological Awareness	Awareness
Policy and Governance	Regenerative Action Responsibility	Behavioural Change
Public Authorities	Regenerative Action Responsibility	Behavioural Change
Sensory Perceptions	Regenerative Adaptations Ecological Awareness	Awareness
Visitor Perceptions	Regenerative Adaptations Ecological Awareness	Awareness
Visitor Access	Responsibility Regenerative Stewardship	Education
Well Being	Regenerative Adaptations Ecological Awareness	Awareness