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Authors: Clark Banack & Glen Hvenegaard

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Dark Sky Tourism and Rural Development: Lessons From the Jasper Dark Sky Festival

Clark Banack
University of Alberta
Edmonton, Alberta, Canada
csbanack@ualberta.ca

Glen Hvenegaard
University of Alberta
Edmonton, Alberta, Canada
gth@ualberta.ca

Abstract

In the face of several ongoing challenges, rural communities are increasingly turning to tourism, including Dark Sky Tourism, as a component of their sustainable economic development strategy. This paper employs a case study approach to analyze critically the experiences of Jasper, a rural community in the west-central region of Alberta, Canada, that has hosted the Jasper Dark Sky Festival since 2011. The goals of this paper are twofold: (1) to critically examine the history of the festival and outline the key factors behind its success as well as its ongoing challenges, and (2) to extract from this analysis broader advice for other rural communities considering the promotion of dark sky tourism events as part of a larger economic development strategy. Ultimately, we highlight how rural communities can capitalize on a novel form of tourism, integrate dark sky tourism into community endeavours, and target and deliver related educational activities, while supporting a new form of rural economic development.

Keywords: dark sky tourism, rural development, Jasper, festival management, festival tourism

Tourisme du ciel étoilé et développement rural : leçons du Jasper Dark Sky Festival

Clark Banack
University of Alberta
Edmonton, Alberta, Canada
csbanack@ualberta.ca

Glen Hvenegaard
University of Alberta
Edmonton, Alberta, Canada
gth@ualberta.ca

Résumé

Face à plusieurs défis persistants, les communautés rurales se tournent de plus en plus vers le tourisme, y compris le tourisme du ciel étoilé, comme élément de leur stratégie de développement économique durable. Cet article utilise une approche d'étude de cas pour analyser de manière critique les expériences de Jasper, une communauté rurale de la région du centre-ouest de l'Alberta, au Canada, qui accueille le Jasper Dark Sky Festival depuis 2011. Les objectifs de cet article sont doubles : (1) examiner de manière critique l'histoire du festival et décrire les facteurs clés de son succès ainsi que ses défis actuels, et (2) extraire de cette analyse des conseils plus larges pour d'autres communautés rurales envisageant la promotion d'événements touristiques de ciel étoilé dans le cadre d'une stratégie de développement économique plus large. Enfin, nous soulignons comment les communautés rurales peuvent capitaliser sur une nouvelle forme de tourisme, intégrer le tourisme du ciel étoilé dans les efforts communautaires et cibler et proposer des activités éducatives connexes, tout en soutenant une nouvelle forme de développement économique rural.

Mots clés : tourisme du ciel étoilé, développement rural, Jasper, gestion de festivals, tourisme de festival

1.0 Introduction

Many rural communities in Canada face significant challenges related to technological changes, an increasingly globalized economy, declining economic opportunities, capital flight, the outmigration of youth, decreasing levels of government investment, and deteriorating infrastructure (Epp & Whitson, 2001; Halseth, 2019; Speer, 2019). One of the more innovative responses to these challenges has been the embrace of rural-based tourism to generate new forms of economic activity. Rural tourism generally consists of promoting smaller-scale tourism experiences in non-urban environments, often featuring natural landscapes or events prominently and emphasizing the opportunity for participants to directly experience these environments and/or the traditions of the communities or families that occupy them (Irshad, 2012; Ruiz-Real et al., 2022). Rural tourism is a potential form of *sustainable* development for rural communities, given the emphasis on small-scale, authentic experiences within natural rural landscapes built on resources readily available in their regions (Lane & Kastenholz, 2015). Common examples of rural, nature-based tourism include agrotourism (Nooripoor et al., 2021), nature-based festivals (Massey & Mason, 2023), hunting tourism (Martín-Delgado et al., 2020), wildlife tourism (Hvenegaard, 2007; Segobye et al., 2022), and adventure sports tourism (Costa & Chalip, 2005).

This paper focuses on the relatively recent emergence of dark sky tourism (Jacobs et al., 2020) in rural regions and its potential role as a component of a sustainable rural economic development strategy. Specifically, we critically analyze the experiences of Jasper, a rural community in the west-central region of Alberta, Canada, that has hosted the Jasper Dark Sky Festival (JDSF) since 2011. The goals of this paper are twofold: (1) to critically examine the history of the JDSF and outline the key factors behind its success as well as the ongoing challenges it faces and (2) to extract from this analysis broader lessons for other rural communities considering the promotion of dark sky tourism events as part of a larger economic development strategy. Ultimately, we seek to highlight how rural communities can capitalize on a novel form of tourism, how they can integrate dark sky tourism into community endeavours, and how they can target and deliver related education activities, all while supporting a new form of rural economic development. In addition, this study makes a broader contribution to the literature on rural tourism by providing an overview of a very successful tourist event in a small community that has evolved to a point wherein organizers have purposefully sought to transition toward a more sustainable pathway as opposed to seeking to continually grow the event without proper concern for the ramifications of that growth.

It is important to acknowledge, however, that Jasper is already a tourist hot spot, complete with an extensive tourism infrastructure and reputation. Nestled within the world-famous Canadian Rocky Mountains, the park in which the town of roughly 4100 is located already draws an estimated 2.5 million visitors annually (Dawson, 2023). This number is likely incomprehensible to almost every other rural community across North America or Europe, with a few exceptions such as similar rural tourist hotspots like Banff, Alberta; Whistler, British Columbia; or the various Alpine villages or small seaside communities throughout Europe. Given these vast advantages that Jasper would have over almost any other rural community, it is highly unlikely that most other rural communities could replicate the magnitude of the JDSF. However, a critical examination of the festival's history does unveil several potentially helpful insights for other rural communities considering forays into dark sky tourism promotion on a smaller scale. We return to these in the discussion section of the article.

1.1 Dark Sky Tourism's Potential in Rural Regions

Many tourists are increasingly interested in dark sky phenomena and are traveling to sites with suitable opportunities to observe the night sky (Beeco et al., 2023; Collison & Poe, 2013; Weaver, 2011). Dark sky tourism is "tourism based on unpolluted night skies involving observation and appreciation of naturally occurring celestial phenomena" (Blundell et al., 2020, p. 550), and is generally promoted as a potential form of sustainable economic development as well as a tool to raise awareness about the negative effects of light pollution. Dark sky tourism products and locations usually include astronomical observatories, parks (national, provincial, municipal), amateur astronomy organizations, specialty tourism organizations, festivals, and other dark sky tourism experiences (Collison & Poe, 2013; Labuda et al., 2016). In addition, the increasingly popular act of traveling to witness the aurora borealis in many locations across Northern Europe and Canada is a significant component of dark sky tourism (Thompson, 2019; Williams, 2019).

Dark sky tourism also generally includes education about light pollution, which can cause significant negative impacts on wildlife health, human health, aesthetics, and wasted energy (Davies & Smyth, 2018; Dalgleish, 2021), the latter of which is estimated at $7 billion USD annually (Gallaway et al., 2010). In addition, increased light pollution can drastically reduce the viewability of the night sky (Kanianska et al., 2020). In 2016, Falchi et al. estimated that 23% of land surface between 75°N and 60°S is exposed to some form of artificial light at night, such as skyglow, glare, and light trespass. Light pollution is projected to increase (Green et al., 2022), and, as a result, dark skies will become an increasingly rare resource (Cauwels et al., 2014; Mitchell & Gallaway, 2019).

In response to these trends, many regions are seeking to reduce light pollution through management actions (Silver & Hickey, 2020), such as placing limits on light brightness, installing timers and sensors on lights, adjusting light hues, reducing the number of lights, and creating shields to direct lights. The most aggressive of these efforts are those that designate certain areas as dark sky parks or preserves (Welch & Dick, 2012). For example, the International Dark Sky Association designates international dark sky sanctuaries, dark sky reserves, dark sky parks, dark sky communities, and urban night sky places in order to (with varying priorities, locations, and spatial layouts) raise awareness, identify threats, reduce light pollution, provide education, and promote authentic nighttime experiences. The Royal Astronomical Society of Canada [RASC] (n.d.) provides certification of dark-sky sites, such as dark-sky preserves, nocturnal preserves, and urban star parks, again with varying priorities and limits on artificial lighting. As of early 2025, RASC lists at least 27 dark sky parks across all regions of Canada (RASC, n.d.). In each of these cases, parks, regions, and communities have sought to promote the dark sky for a variety of benefits, such as enhanced human well-being, wildlife health, and rural economic development through tourism (Davies & Smyth, 2018; Bell et al., 2014; Mitchell & Gallaway, 2019; Hvenegaard, 2024).

It is within this context of both increasing efforts to preserve dark skies and an increasing desire to experience and enjoy darks skies that dark sky tourism has emerged. Although academic research into dark sky tourism is a relatively recent phenomenon, it is already clear that dark skies have the potential to generate valuable economic impacts and recreational opportunities for regions willing to pursue it. For example, projections about dark sky tourism in the Colorado Plateau region of Arizona, Colorado, New Mexico, and Utah suggest that non-local tourists

will spend $5.8 billion USD over the next 10 years, generate $2.4 billion in higher wages, create 10,000 additional jobs each year for the region, and spread tourism activity more evenly throughout the year (Mitchell & Gallaway, 2019). Most dark sky tourists stay an average of 4.2 days at such destinations in Utah, spending $834 per person (Smith et al., 2023). At Bryce Canyon National Park and Cedar Breaks National Park, Utah, attendance at interpretive events focused on stargazing, nocturnal wildlife, and light pollution exceeds attendance at all other interpretive events combined. Moreover, Fernandez-Hernandez et al. (2022) found that tourists strongly support the development of resources to facilitate stargazing and were willing to pay to provide those resources.

For rural communities eager to generate new sources of sustainable economic activity, the allure of dark sky tourism is obvious. In general, the combination of low population densities and long distances from urban centres ensures a much higher probability of having "dark skies" compared to their big-city neighbours—characteristics that situate many rural communities in an advantageous position in terms of responding to an increasing demand for dark sky tourist activities. As Jacobs et al. note, given the wide array of potential events related to dark skies, from stargazing and viewing comets or meteor showers to enjoying the aurora borealis or taking in an educational astronomy presentation, dark sky tourism provides rural communities with "opportunities for unexpected collaborations between tourism stakeholders, local communities, and scientific institutions" (Jacobs et al, 2020, p. 90). Similarly, the very remoteness that ensures the necessary dark skies for such opportunities means that should the rural community in question successfully launch and promote dark sky events capable of drawing urbanites to their regions, it is likely those visits will be paired with overnight stays and the peripheral spending that accompanies such stays. Yet, luring those urbanites to remote regions for dark sky events is no small task, especially if there are no other complementary tourism opportunities in the area that could occupy visitors during the day. And, of course, most rural communities will lack the necessary infrastructure to host large numbers of people, thereby ensuring that any dark sky-related tourism opportunities will often remain small in scale. Still, we think that there is rural development potential in this area, and as this article unfolds, we will speak to some of the lessons that can be extracted from a critical analysis of the JDSF.

2.0 Methods

2.1 Study Site

This study focused on the JDSF held in Jasper National Park. The park is located in west-central Alberta, Canada, about 360 km west of the provincial capital, Edmonton. The RASC designated the park as a Dark Sky Preserve (DSP) in 2011, and it is currently the second largest in the world. In accordance with this designation, Jasper National Park works to minimize artificial light and educate the public and policy-makers about the importance of dark skies. The park and Jasper townsite host busy tourist seasons from June to August and December to April. The shoulder season in October has available amenities (e.g., low hotel occupancy) and viewing conditions that are likely to support dark sky tourists (e.g., longer nighttime hours, warm enough temperatures, and minimal cloud coverage).

The festival began in 2011, and is now led by Tourism Jasper, with support from the Municipality of Jasper, Parks Canada, the Rotary Club of Jasper, the Edmonton

International Airport, WISEST (Women in Scholarship, Engineering, Science, and Technology), the Edmonton Rocketry Club, the Canadian Space Agency, Pursuit (a tourism experience company), the Telus World of Science Edmonton, and the RASC—Edmonton Centre. The festival runs for 2–3 weeks (with most activities on weekends) during October and aims to draw visitors to the area during the shoulder tourist season, raise awareness and support for reducing light pollution, and celebrate the night sky. The festival reaches a wide variety of visitors, including adults and children, astronomy experts and novices, day and overnight visitors, and local residents and distant tourists. Currently, the festival includes a variety of free and for-purchase activities such as guest speakers, daytime and nighttime sky viewing through scopes, night hikes, Indigenous cultural awareness events, model rocketry demonstrations, science demonstrations, indoor planetarium tours, helicopter cruises, Skytram rides, stargazing, fireside storytelling, receptions, musical performances, drone shows, trivia nights, youth science camps, and more. Importantly, our research on dark sky tourism occurred before the 2024 wildfires burned 32,722 ha in Jasper National Park and destroyed about 30% of the buildings in the Jasper town site. Undoubtedly, the wildfire will affect the future of the JDSF and has already caused the 2024 offering to be significantly scaled down (Parks Canada, 2024).

2.2 Data Collection and Analysis

In this study, we gathered data in three ways. First, we used participant observation techniques by attending the festival during two successive years: October 20–23, 2022, and October 19–22, 2023. We chatted informally with guests and attended a wide variety of festival activities. After each event, we took notes about event logistics, attendees, activities, and educational themes.

Second, between October 21, 2022, and January 12, 2023, we conducted semi-structured interviews with 12 "festival insiders," including festival organizers, presenters, stakeholders, and representatives of key participant groups (nine online, three in person). We also conducted semi-structured interviews with five additional individuals (all online) who were involved with dark sky tourism elsewhere in Alberta in order to better understand other examples of dark sky tourism and to begin to grasp the potential for dark sky events beyond those held in Jasper, Alberta. For all 17 interviews, the average length was 53.7 minutes (range = 41.0-69.8). We asked open-ended questions about festival involvement, history, target goals, educational impacts, local economic impacts, challenges, future plans, lessons learned, and advice for other dark sky event organizers. We audio recorded each interview, took notes, and transcribed the recordings verbatim. Both authors independently read the transcripts and used open-coding techniques to identify key themes before jointly discussing the findings to identify the most relevant themes to emerge from the data.

Third, we conducted searches for JDSF activities mentioned in online sources going back to 2011, such as digital and print newspapers, websites, and Facebook pages or blog posts. We organized this information chronologically to help us re-create the historical phases of the festival and fill in some of the gaps left by the interview data in terms of understanding any changes in purpose, scale, and implementation by festival organizers. The findings derived from the analysis of all three forms of data (observation, interviews, and document analysis) are presented below.

3.0 Results

3.1 Evolution of the Jasper Dark Sky Festival

Below, we provide a historical overview of the evolution of the JDSF before turning to a broader summary of the factors that have helped ensure the success of the festival, the ongoing challenges it faces, and some advice for other rural communities considering forays into dark sky tourism.

3.1.1. Pre-designation and designation. The JDSF is rooted in work done by the Parks Canada Staff in Jasper National Park, who, in 2010, began to build a public astronomy educational program and made the decision to pursue a Dark Sky Preserve (DSP) designation from the RASC. The first ever JDSF took place in the fall of 2011, largely in celebration of the park being awarded the DSP designation. It was a small and very local event held over a single weekend in October that included Star Parties, guided nighttime walks, wagon rides led by Parks Canada interpreters, and public telescope viewing hosted by volunteers from the Edmonton branch of the RASC. Although Tourism Jasper was involved from the beginning, Parks Canada served as the key funder of the event. The 2012 JDSF followed a similar pattern, with small-scale events in and around the community led largely by Parks Canada staff.

3.1.2. Exploration and growth. By 2013, Tourism Jasper, the member-owned organization responsible for promoting Jasper's tourist opportunities across Canada and beyond, came to replace Parks Canada as the central organizer of the festival. Parks Canada's central motivation in participating in the festival was to educate the public on the importance of dark skies. In contrast, Tourism Jasper, while not adverse to such educational efforts, saw the JDSF mainly as a potential opportunity to draw additional tourists to Jasper in a traditionally slow fall "shoulder period" after the summer visitors had gone and before downhill skiers arrived. This represented an important transition in the evolution of the festival as more effort was thus dedicated to planning a festival capable of drawing visitors who would subsequently stay in local hotels and eat at local restaurants. The 2013 Festival was the first to pair the nighttime walks and telescope viewings with ticketed talks and presentations by science-focused entertainers such as Jay Ingram of Discovery Channel's *Daily Planet* and David Levy, a well-known "comet discoverer" in astronomical circles. This period also represented a firm step toward a festival that expanded its offerings to include events related to what organizers dubbed "dark sky adjacent" topics such as space exploration and more general science-based subjects.

3.1.3. Big names, big crowds. The 2014 JDSF represented another key transition in the evolution of the festival as Tourism Jasper continued to work towards growing the festival in ways that would draw much larger crowds. Chris Hadfield, the first Canadian to walk in space and command the International Space Station, headlined the 2014 festival. To host such a well-known figure was not an inexpensive endeavour, but Tourism Jasper, with the help of Tourism Alberta and additional corporate sponsors, made the decision to significantly increase their monetary investment in the festival with the goal of creating an even larger shoulder-season event capable of consistently filling local hotels and restaurants with science enthusiasts eager to rub shoulders with space-related or science "rock stars."

Because Jasper did not have an indoor venue capable of holding large crowds, a 1200-person tent was rented and, over the next six years, it was routinely filled with fans willing to pay upwards of $100 per ticket to listen to science celebrities including, among others, Hadfield (2014 and 2015), Bill Nye "The Science Guy" (2016), George Takei (2016), Canadian Astronaut Jeremy Hansen (2016), British Physicist and well-known TV-based science educator Brian Cox (2017), and science TV personality Emily Calandrelli (2018).

The investment in well-known science or space-based celebrities coincided with the decision to expand the length of the festival from a single weekend to 10 days (albeit with almost all the most popular programming contained to the two weekends that bookended the 10-day period). Since 2014, the Edmonton Symphony Orchestra has performed the *Symphony Under the Stars* at the famed Jasper Park Lodge on the first weekend of the festival, with most big-name speakers reserved for the second weekend, along with a selection of free or low-cost public activities and events mixed in, from guided walks and telescope viewing to model rocket displays and Indigenous-led campfire stories. A science-based educational program created in conjunction with local schools was also launched. In 2015, a permanent and privately-owned planetarium opened at the Jasper Park Lodge, creating additional opportunities for star and planet gazing as well as general astronomy education and entertainment. The festival also successfully lured members of large existing astronomical and space-related clubs such as the *Aurora Chasers* and the *Space Hipsters* to the festival, with the former now routinely holding their annual group meetings at the JPL during the first weekend of the festival.

In sum, 2014–2019 represented a huge period of growth for the festival. Driven especially by the significant investment required to host A-list science and space-focused speakers, hotel occupancy, which had traditionally hovered around 30% in mid-October, consistently rose to between 85–90% during the two weekends of the festival (Jasper Dark Sky Festival, 2018) and local media estimated crowds as large as 10,000 attended the 2016 festival (Byrne, 2016), a massive jump compared to the early years of the festival marketed largely to locals.

3.1.4. Consolidation and sustainability. Even in the midst of very large crowds and an undeniably successful effort by Tourism Jasper to lure visitors to town in the shoulder season, by 2017/18, festival organizers were beginning to question the sustainability of a festival built around a very expensive collection of guest speakers. Not only was the annual budget an increasing concern, some local residents were increasingly concerned that the high ticket prices to see A-list speakers were making the festival far less accessible than in the past (Hasson, 2014). Thus, feeling confident that they had successfully put the festival well on the radar of dark-sky enthusiasts from across Canada and beyond, organizers began to chart a path forward that still included a collection of interesting and informative (albeit less expensive) guest speakers, as well as the annual *Symphony Under the Stars*, guided walks, telescope viewings, and nighttime mountain tram rides of previous festivals, but now with a focus on a wider variety of smaller, more "intimate' events and a more sustainable festival overall.

Although organizers experienced a certain level of trepidation contemplating "a new chapter," this transition was fast-tracked by the arrival of the COVID-19 pandemic and the need to arrange the festival in a way that followed local "social-distancing" rules in 2020. Guest speakers were still at the centre of the festival but were

broadcast on screens from afar to much smaller audiences that were required to produce a "negative" COVID test upon entry. Outdoor activities that could take place in a socially distanced manner were allowed, but overall, the footprint of the festival was far smaller than any of the festivals in previous years. The 2021 festival was more of the same.

The 2022 festival was the first in the so-called post-COVID era and, in essence, represented the first iteration of the event aimed at being more intimate and sustainable than those held in 2014–2019. Audiences were welcomed back to listen to a roster of science and space speakers, although a roster that lacked the star power of a Chris Hadfield or Bill Nye. The large tent was abandoned, and events took place in a much smaller community venue, with ticket prices markedly lower than those charged in 2014–2019. There was also a strong emphasis on free events ranging from telescope viewing and Indigenous-led events to quirky science programs and rocketry demonstrations aimed at children, with the event capped off with a very well attended and family-friendly concert and drone show in a public park. Finally, a trivia night allowed festivalgoers to rub shoulders with guest speakers and compete against them in trivia over beer at the Jasper Legion.

2023 continued much of what worked in 2022, with the biggest exception being a transition away from several stand-alone guest speaker events where attendees, in 2022, could purchase tickets in the $15–20 range, to more events that paired a guest speaking presentation with a 3-course meal at one of several restaurants across town. This change resulted in substantially higher ticket prices, alongside the promise of a more intimate environment than a widely attended lecture. Such a transition speaks well to the inherent tension within a festival of this nature that seeks to promote general education about dark skies to a wide audience while still meeting the expectations of the local tourist industry who, through their membership in Tourism Jasper, are ultimately the chief funders of the festival. Indeed, support for this approach was not unanimous amongst those we interviewed. In order to offset this new approach to a degree, festival organizers added some free events to the schedule, including several morning *Talk Nerdy to Me* coffee hours wherein attendees were welcome to drop-in and "chat science, ask festival questions…and maybe run into one of these speakers at this coffeehouse social," events that reportedly enjoyed strong attendance (Jasper Dark Sky Festival, 2023).

3.1.5. The future of the festival. In 2023, the festival expanded to a third weekend, although in a very preliminary way, offering only a small fraction of the events on the first two weekends, and culminating with a JDSF Ball that coincided with the Halloween weekend and invited attendees to "put on your best sci-fi costume." Although this weekend was unlikely to draw many outsiders to Jasper, the organizers are clearly laying the groundwork for a permanent expansion of the festival and are likely making plans for events that could drive hotel occupancies for a third weekend, potentially building around a "sci-fi" theme. The organizers are also seeking to build a more formal connection with the International Dark Sky Association, including a potential future application to be designated an International Dark Sky Park, with the hope of drawing more international dark sky tourists.

Taking a step back, the widely cited tourism life cycle (Butler, 1980; 2009) offers some insights about the trends observed above. The pre-designation and designation phase of the JDSF parallels the first part of Butler's emergence stage, which involved the discovery, packaging, and initial marketing of the dark sky tourism

product. The JDSF's exploration and growth phase parallels the second part of Butler's emergence phase, in which new ideas and products were tested, governance was established, and name recognition was started. The JDSF's big names, big crowds phase parallels Butler's growth phase, in which there was significant increase in attendance, budgets, and local impacts. At this point, the organizers faced a decision about the future, partly forced upon them by the COVID-19 pandemic. They chose consolidation and sustainability, which parallels Butler's maturity/consolidation phase, or perhaps the stabilization phase. At present, it appears that the JDSF has avoided a decline phase. The future may involve some growth, but it may be spread over more weeks, rather than concentrated in just two weeks. As noted above, the wildfire that burnt through sizable portions of both Jasper National Park and the Jasper townsite in the summer of 2024 represented an unexpected and significant hardship for the community and it is unclear how this may impact the JDSF going forward. The festival scheduled for the fall of 2024 was significantly scaled down.

3.2 Success Factors for the JDSF

It is difficult to characterize the JDSF as anything but a clear success story thus far, especially when viewed through the lens of seeking to drive visitation to the National Park and townsite in an obvious tourist shoulder season. Building up from a small, largely local, weekend of events celebrating the Park's dark sky designation in 2011, multiple interviewees confirmed that the festival now routinely delivers hotel occupancy rates in Jasper in the 85% range over both weekends in October, a substantial increase from the 30% average experienced over the same weekends prior to 2011. There is, of course, a wide range of factors that can help explain this level of success. Drawing from our semi-structured interviews with JDSF organizers, contributors, and long-time guests, in addition to our observations attending the festival on two consecutive years, we list below the most important factors that explain the JDSF's success thus far.

1. *Attaining a Dark Sky Preserve designation from the RASC*: Not only did the designation serve as the initial motivation to launch a dark sky event, but it also provided significant, and largely unexpected, media coverage drawing attention to what was, at that time, the world's largest dark sky preserve. Since 2011, the designation has provided the JDSF a meaningful level of credibility in the eyes of serious dark sky tourists.
2. *The foresight to adapt in ways that have ensured periods of both growth and sustainability*: Not only did key local champions see the potential for the festival in its early days, Tourism Jasper managed to lure some very big (and expensive) names from the space and science entertainment world between 2014 and 2019, thereby supercharging the festival's growth, before recognizing the need for a more sustainable (and less expensive) program of offerings going forward.

   The strategic decision to market the JDSF to particular groups, such as the *Aurora Chasers* and the *Space Hipsters,* has also proven to be a successful strategy in terms of maintaining attendance rates in the midst of a transition to a more sustainable festival model. Finally, developing programming in areas the organizers deemed "dark sky adjacent," essentially offerings related to space exploration or other science-based education and

entertainment, have allowed for opportunities to broaden the appeal of the festival well beyond stargazers and astronomy fans.

3. *Developing a balance between traditional educational programming and "info-tainment":* The JDSF has done an excellent job of curating opportunities for serious amateur astronomers, "aurora chasers," and scientists to congregate together, meet "big names" in their fields, participate in relevant activities, and share their knowledge with a broader audience, while simultaneously offering many family-friendly and "fun" dark sky (and "dark sky adjacent") activities and events in ways that obviously bolster attendance rates at the festival.

4. *The maintenance of good relations among many key organizations and stakeholders*: The capacity of Parks Canada and Tourism Jasper to work together in the early years proved vital in terms of seeing the JDSF emerge from a small, local event to something capable of growing substantially. Similarly, the capacity of Tourism Jasper to successfully negotiate roles for a wide variety of contributors, including Indigenous groups and individuals, the RASC, the Telus World of Science, the Edmonton Rocketry Club, the University of Alberta's Women in Scholarship, Engineering, Science, and Technology club, the Edmonton Symphony Orchestra, and a wide variety of local tourist-based businesses, has ensured a well-balanced and intriguing set of offerings for attendees.

5. *The role of local champions*: The festival, from the very beginning, benefitted from some key local champions who happened to be both very knowledgeable and very passionate about dark sky preservation and education. In fact, it was a local journalist who first put the possibility of a Dark Sky designation on the radar of Parks Canada, before a Jasper-based Parks Canada interpreter led the nomination process that required intensive data gathering and collaboration. A second local science-focused journalist has also played a key role in promoting the festival from its early stages, now serving as the JDSF master of ceremonies and coordinating much community engagement, including leading the educational program in the local schools during the festival. The presence of these local champions has been especially important given the general staff turnover that has occurred within Tourism Jasper and Parks Canada over the duration of the festival's history.

6. *Ensuring community "buy-in":* Although the high ticket prices to attend many of the big-name guest speaker events in 2014–2019 annoyed some community members, the adoption of more free and low-cost options was incorporated in recent festivals to address such concerns. In addition, the science-based educational program that runs in local schools in conjunction with the festival has been very popular.

7. *Jasper's long-held reputation as a tourist destination and its existing tourist infrastructure*: One key factor that few other rural locations can match is Jasper's capacity to offer attendees the backdrop of the majestic Canadian Rockies, in addition to a long list of accommodation, restaurant, and tourist activity options that exist independent of the JDSF. This provides a significant additional incentive for potential attendees to travel to the JDSF.

3.3 *Challenges Faced by the JDSF*

Throughout the festival's history, organizers faced (and continue to face) a wide range of challenges. We highlight the most important and persistent below.

1. Weather: The most obvious external challenge is the weather. Ideal conditions for stargazing and related activities require clear skies, something that is well beyond the organizers' control. More generally, it is an open question of the degree to which ongoing climate change will affect weather patterns going forward, from increasing cloudiness to a higher likelihood for intense storms—two occurrences that will negatively impact dark sky viewing. For this reason, the JDSF has worked hard to develop a lengthy program of activities that are not reliant on traditional stargazing. However, hosting a festival in the Canadian Rockies in mid to late October still encounters the very real risk of significantly cold and snowy conditions—a fact that puts attendance numbers at risk every single year.
2. Financial resources: Hosting an event of this magnitude is a significantly expensive venture, especially when centred on "rock star" guests, who often charge hefty appearance fees. Indeed, such costs, in addition to those related to hosting large crowds (e.g., tent rental, staff, and security), ultimately pushed the organizers of the festival in a different direction. However, even in its new iteration, the JDSF faces ongoing fiscal challenges related to rising costs, declining corporate sponsorship, and the reluctance of Tourism Jasper stakeholders to pay additional dues in the wake of the COVID-19 pandemic and the subsequent loss of significant portions of income over two tourist seasons.
3. Appropriate facilities and infrastructure: Despite Jasper's extensive tourism infrastructure, the town does not have a venue capable of consistently hosting upwards of 1000 guests for a large event, hence the tent rental between 2014–2019.
4. Tensions related to the differing objectives of driving visitation and educating a wide swath of the public about the importance of dark skies: This is perhaps the most interesting and complex challenge the JDSF faces. Generally speaking, relations between Tourism Jasper, many key festival contributors, and Parks Canada is positive. However, structurally speaking, there is a clear tension between the central goals of Tourism Jasper (consistently seeking to draw large crowds to fill local hotels while also offsetting festival costs by selling tickets to several festival events) versus the broader goals of a festival that has its roots in Parks Canada seeking a Dark Sky Preserve designation as the centrepiece of its hopes to educate as many people as possible about the importance of dark skies in general and the need to change behaviour about light pollution in particular.

   Again, from our perspective, this tension does not play out in an incendiary manner, but the potential for meaningful conflict is present. Specifically, we encountered differing opinions on the appropriate number of free or low-cost events to offer relative to those higher-cost offerings that route attendees to Tourism Jasper stakeholders (i.e., the intimate speaker events that are paired with 3-course meals or that require the purchase of a relatively expensive ticket on the Skytram). Similarly, there is some debate around the number of events that aim to educate the public about dark skies

versus those that are, in the words of festival organizers, "adjacent" (i.e., events related to space exploration or other cutting-edge STEM topics such as the advent of Artificial Intelligence). Indeed, separate research noted that educational outcomes related to the importance of dark skies, and especially those related to behavioural change aimed at preserving dark skies, were not strong at the JDSF (Hvenegaard & Banack, 2024).

4.0 Discussion

4.1 Lessons for Other Rural Communities Considering Dark Sky Tourism

Clearly, an additional factor that helps the JDSF remain popular is the uniqueness of the event in western Canada, a characteristic that raises the potential problem of "oversupply" in dark sky tourism more generally. How many related events can exist within a given region before the "uniqueness" wears off and participant interest dwindles? JDSF officials we spoke with were not concerned about competition from other rural communities given the many sizable advantages the long-running event held in a popular mountain town possesses. However, it is certainly true that a series of similar dark sky events in neighbouring communities across any given region may run into the issue of oversupply. With this caveat in place, this section offers some lessons to those communities considering dark sky tourist offerings.

There are several factors that have helped to ensure the success of the JDSF, although they continue to face certain challenges. For those rural communities considering a foray into the promotion of dark sky tourism as part of a broader economic development strategy, especially if they are considering organizing a scheduled event rather than simply inviting individuals and groups to enjoy the dark skies at whatever time of the season they wish, there are some clear lessons that can be gained from this analysis. This is true even though Jasper has significant advantages in terms of tourist infrastructure and reputation compared to almost all other rural communities exploring the promotion of dark sky tourism.

First and foremost is the somewhat obvious point that even the JDSF started small and, following much of the pattern familiar to the broader tourism life cycle (Butler, 1980; 2009), grew and transitioned through subsequent stages. Attempting to ignore those early stages wherein a key local foundation is built and aiming quickly for a larger event would most likely be a mistake. More generally, acquiring a Dark Sky Preserve designation, while not mandatory, would help to generate media coverage and a certain credibility that could provide a boost in the early stages of the event in question. In addition, striking that balance between activities and education related to traditional astronomy, on the one hand, and more general "info-tainment" that would appeal to wider audiences interested in the "fun" side of dark skies, space exploration, or science in general, would do much to boost attendance. This is especially true when it comes to the importance of including family-friendly activities. Similarly, many interview respondents emphasized the importance of having guest speakers who were both informed about the topic at hand *and* were good and fun communicators. Having guests from the RASC, the Aurora Chasers, or even the local model rocket club could be a boon in this regard. Similarly, making a connection with a local university that could allow for the participation of astronomy professors and astronomy students in both the planning and delivery of the event could add significant value in terms of increasing meaningful educational content and putting the event on the radar of a larger group of potential attendees.

That said, for small-scale events in remote locations where this connection may be more difficult to secure, even having someone from the local high school or astronomy club may be sufficient.

Further, including appropriate Indigenous content related to longstanding Indigenous knowledge and stories related to stars delivered by appropriate Indigenous individuals or groups would demonstrate an important level of inclusivity and help boost attendance as such content has proven popular elsewhere. Ensuring opportunities for intimate and interactive settings was also noted as important by several respondents.

It is also clear that ensuring a good portion of events are not weather-dependent is important, as is having community "buy-in" and a small handful of local champions who are passionate about the planned event and are trusted within the community. Jasper's decision to include an educational component within their local schools is a particularly noteworthy example of working to ensure community buy-in. Building connections with other local youth groups (Girl Guides and Scouts, for instance) would help in this regard and would have the added benefit of increasing STEM educational opportunities for youth in rural communities.

Of course, the vast majority of rural communities contemplating dark sky tourism will continue to be challenged by their lack of tourist infrastructure compared to a place like Jasper. In most rural regions, dark skies may be plentiful but there will almost always be a limit to how many visitors can be housed in local hotels and fed in local restaurants. Of course, building programs or events near campgrounds in the warmer months can alleviate this constraint to a degree, although for rural communities in the temperate regions, these months correspond with far shorter periods of evening darkness. Similarly, from a purely economic development perspective, hosting campers is often not as lucrative for local businesses as hotel stays. One potential solution to a lack of accommodations in the cooler months of the year, when dark sky-related activities are easier to coordinate, would be to expand residence-based short-term rentals via services like Airbnb. Although, in many jurisdictions, local bylaws can make this difficult. Ultimately, it will require some creativity on the part of rural communities seeking to solve this issue. When asked if they could envision successful dark sky tourism events in smaller rural communities, one long-time contributor to the JDSF spoke directly to this notion of creativity:

> Well, there's always a demand for good stuff... (but) I think it's hard. Astronomy observing by its nature is just weird and remote and dark and cold. And so how you package that is tricky. There's nothing that can't be done, but it's tricky. Because you've got to have people who want to be where you are… And they will need some amenities. But is it also possible to think about [amenities] in a whole different way? I mean, is there a remote [spot] that's got a bunch of yurts… they need to fill their yurts in October and November [for example]? So, you hire an astronomer [and try to start something around this….] (Participant 6, personal communication, December 13, 2022).

A long-time JDSF organizer added an important bit of context to the idea that rural communities considering dark sky tourism promotion will have to be creative to ensure its success. They noted that a "big name" contributor to the JDSF has often urged organizers not to deviate from what makes the festival special:

> It's [special] because it's unique to place and it's intimate. And he's like, don't try and make it something it's not. And I think, you know, for smaller communities, I might give the same advice: You harness what is there. And you might be surprised who will come to that. I think that whole 'keeping it unique to where you live' and not losing sight of what makes it special [is important]. It's so tempting, you know, to want to….sparkle it up in different ways. [But that's] incongruent with place. And people will notice that, I think. People are so hungry for genuine experience…I think that might be a real way forward for many people looking at this kind of thing in the future (Participant 8, Personal communication, December 11, 2023.

5.0 Conclusion

The JDSF provides insights about the conceptual evolution of festivals over time and practical advice for other rural, dark sky tourism destinations. Since its humble beginnings in 2011, largely envisioned as a local celebration of Jasper National Park having acquired a coveted Dark Sky Preservation designation, the festival has grown substantially, thanks first to the appearance of an impressive array of space and science celebrities, and now more recently through a transition to a more sustainable and family-friendly event that still draws large crowds. As Blundell et al. (2020) note, it is important to evaluate and engage with existing dark sky tourism that can truly support sustainable tourism in rural areas. Drawing from our analysis of this very successful dark sky festival, we note several concrete lessons for rural communities, including those without the tourist infrastructure and reputation enjoyed by Jasper, who are considering the promotion of local dark sky attractions and events.

We acknowledge that there are some noteworthy limitations to this study. Although we conducted only 17 interviews, we interviewed a diverse set of respondents and arrived at a saturation of ideas that we describe in the sections on phases, factors for success, challenges, and lessons. In addition, we conducted this study in the first two offerings of the JDSF following the pandemic, which affected the continuity and possibilities for such a festival. And, of course, there is much potential for further research. Regarding attendance at the JDSF, it would be useful to determine exact numbers, explore the expectations and satisfactions of participants, and find ways to appropriately segment participants, perhaps through specialization frameworks (Henry et al., 2022; Fernandez-Hernandez et al., 2022). Regarding rural development issues, further exploration of the local economic impacts, return on investment from the JDSF organizers (both financial and volunteer hours), the role of champions, interactions among stakeholders, how the level of local support changes over time, and the issues associated with local versus regional volunteers would all be worthwhile (Massey & Mason, 2023; Escario-Sierra et al., 2022).

Lastly, regarding the broader dark sky tourism industry, finding consistent ways to measure the impact (e.g., attendance, economic impact) of these activities would aid in understanding growth and change over time. Despite the additional work that remains to be done on this important issue, we conclude that, although not without its challenges, the JDSF provides ample evidence of the significant potential in the development of dark sky tourism events for rural communities.

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