

Article

Sustainable Tourism in the Face of Climate Change: An Overview of Prince Edward Island

Elinor Haldane ^{1,2}, Lauren MacDonald ^{1,2}, Nolan Kressin ^{1,2}, Zoe Furlotte ^{1,2}, Pelin Kinay ^{1,2,*}, Ryan Guild ^{1,2} and Xander Wang ^{1,2} 

¹ Canadian Centre for Climate Change and Adaptation, University of Prince Edward Island, Charlottetown, PE C0A 2A0, Canada

² School of Climate Change and Adaptation, University of Prince Edward Island, Charlottetown, PE C1A 4P3, Canada

* Correspondence: pkinay@upeii.ca; Tel.: +1-902-388-2013

Abstract: Tourism is being impacted by climate change all around the world. Tourism is now seen as one of the economic sectors least equipped for the risks and opportunities provided by climate change, and it is just now establishing the capacity to advance the knowledge required to teach businesses, communities, and governments about the concerns and potential solutions. As a small coastal island, Prince Edward Island (PEI) on Canada's Atlantic coast is highly vulnerable to climate change extremes, including coastal erosion, sea-level rise, and flooding. The island's tourism industry generates substantial revenue for businesses and the government, yet it is highly vulnerable to the climate extremes that impact beach and sea-faring attractions. Limited research has been reported on this topic, and most information on island tourism and how sustainable tourism is achievable is out of date. Here, we present evidence of climate-related impacts and vulnerabilities in tourism within PEI and highlight existing and future adaptation strategies to support sustainability in this sector. Key information gaps are highlighted, and recommendations are proposed to facilitate climate resilience in Prince Edward Island's tourism sector.



check for updates

Citation: Haldane, E.; MacDonald, L.; Kressin, N.; Furlotte, Z.; Kinay, P.; Guild, R.; Wang, X. Sustainable Tourism in the Face of Climate Change: An Overview of Prince Edward Island. *Sustainability* **2023**, *15*, 4463. <https://doi.org/10.3390/su15054463>

Academic Editors: Paula Remoaldo, Hélder da Silva Lopes, Vítor Ribeiro and Juliana Araújo Alves

Received: 27 January 2023

Revised: 21 February 2023

Accepted: 28 February 2023

Published: 2 March 2023



Copyright: © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Keywords: sustainability; tourism; Prince Edward Island; climate change; adaptation

1. Introduction

Prince Edward Island of Atlantic Canada is the smallest province in the country, merely one-tenth the size of the second-smallest province of Nova Scotia [1]. The sandstone cliff coastline of the island is dotted with many lighthouses and extends for approximately 224 km, with the width of the province varying from 6 to 48 km [1]. Most of the island rests just above sea level, with the highest elevation being in Queens County at 142 m above sea level [2]. With its beaches and lighthouses and many more tourist attractions, PEI is a tourism jewel in the heart of the Atlantic (Figure 1).

Due to its small landmass, PEI is the both the least populated province in Canada (170,688 residents, July 2022) and the most densely populated one [3]. Most of the island's population occupies the countryside, with 53% of islanders living in rural areas and 28% living within a 20-min drive of the province's urban areas. These more rural areas are what fuel Prince Edward Island's primary industries: agriculture, fisheries, and tourism [4,5]. Roughly 95% of the island's land mass is arable [1]. The island's unique iron-rich soil provides ideal growing conditions for over 100 potato varieties grown on PEI [6,7]. PEI's extensive coastline also enables a thriving fishing industry with an average harvest rate of 97 million pounds of lobster, mussels, and oysters each year, allowing tourists to enjoy fresh seafood in the restaurants of PEI [8]. Supporting many fishermen each year, the fishing industry is very important to the economic stability of the island [9]. The implementation of a ferry system in 1941 and the finalized construction of the Confederation Bridge in 1997 solidified Prince Edward Island as an easily accessible vacation destination for domestic

and international travelers alike. Regarding tourism, PEI has the highest GDP reliance on tourism of any Canadian province [10]. In 2019, Prince Edward Island saw a 2.9% increase in tourist traffic with an estimated 1.6 million visitors; this resulted in over \$505 million in estimated tourism expenditures by residents and non-residents (Tourism PEI, Annual Report, 2019–2020. https://www.princeedwardisland.ca/sites/default/files/publications/tourismpei_ar_web_2019-2020.pdf, accessed on 14 November 2022). The success of the tourism industry on Prince Edward Island is possible due to the diverse demographic of tourism activities the island has to offer [1]. Whether camping in Cavendish to take advantage of activities such as mini golf, carnival rides, and the Cavendish Beach Music Festival, or traveling to more rural island locations in search of lighthouses, traditional lobster suppers, and deep-sea fishing excursions, PEI tourism has something to offer for everyone. Something that most tourists have in common is that they travel to the island specifically in search of red cliffs, sand dunes, and beaches, a tourism niche encapsulated by the PEI National Park. Established in 1937, the National Park was originally comprised of two parks situated on the province’s North Shore, Cavendish and Brackley-Dalvay [11,12]. A third park, Greenwich, was added in 1998 to protect and preserve the natural and cultural resources found in the area. Visitation to the Prince Edward Island National Park is most active during the summer season when tourists frequent the province’s most popular beaches, including Brackley Beach and Cavendish Beach [13]. These places are only the tip of the iceberg when it comes to tourist destinations. From the eastern tip to the northern tip, Prince Edward Island is surrounded by tourist attractions and is full of businesses that rely on summer tourism. However, how sustainable is tourism on the fragile sandstone island? Published literature regarding tourism on PEI tends to focus on the performance of the province’s tourism sector, but the vast majority do not consider the implications of climate change on this sector. Research and strategies for dealing with the effects of climate change on the tourist island are inadequate and this is considered a research gap. Climate change adaptation policies and measures, if executed in a timely and effective manner, can generate significant co-benefits, such as greater environmental preservation. Several tourism-related behavioral and adaptive capacities are currently underutilized. The following sections will report on the documented links between tourism and climate change on PEI; the study will then discuss tourism policy and legislation approaches to sustainability. This evaluation will also suggest a future course of action and areas of research to address climate change challenges in this sector.

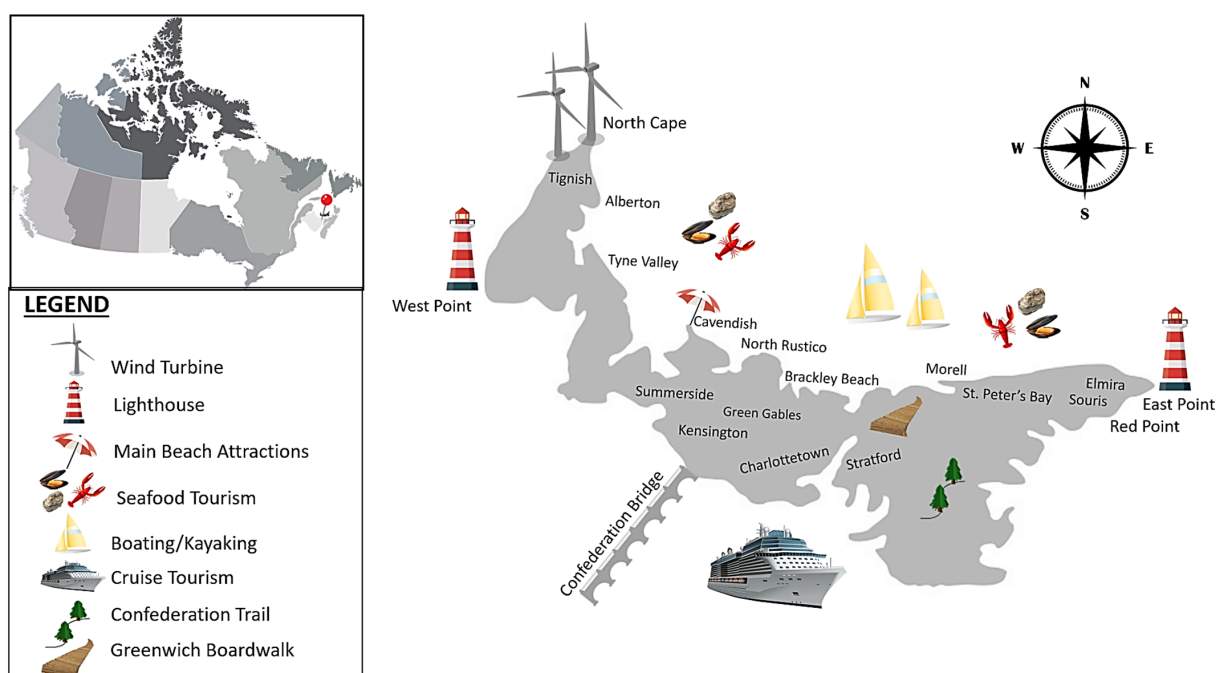


Figure 1. Visualization of Prince Edward Island’s tourism attractions.

2. Methodology

This review provides a new assessment of the literature that investigates the effects of climate change on tourism on PEI. Since the research on this topic is in a preliminary stage, a broad-scoping methodology was implemented. The scoping criteria comprised all English peer-reviewed literature published between 2000 and 2022 on climate change and tourism. Publications were included if they addressed how a changing climate affects tourism (e.g., risks, impacts, and vulnerabilities) and/or how climate-related impacts to tourism are/could be managed (e.g., responses and response capacity). All types of literature were included in the scoping review search strategy, including literature reviews, empirical studies, and reports. The original search terms included: “sustainable tourism” AND “tourism” AND “climate change”, AND “Prince Edward Island” AND “adaptation”, as well as synonyms and related words. The following databases were used to search for peer-reviewed literature: PubMed, Scopus, and Google Scholar. The initial search captured 3079 articles. Duplicates were removed and articles that did not meet the inclusion criteria were also removed after a review of all titles and abstracts. The inclusion criteria were met by a total of $n = 77$ articles (Figure 2). Considering the dearth of existing published literature on this topic, we also included additional sources of information from media and government reports, as well as personal interviews with provincial tourism officials and tourism-related NGOs.

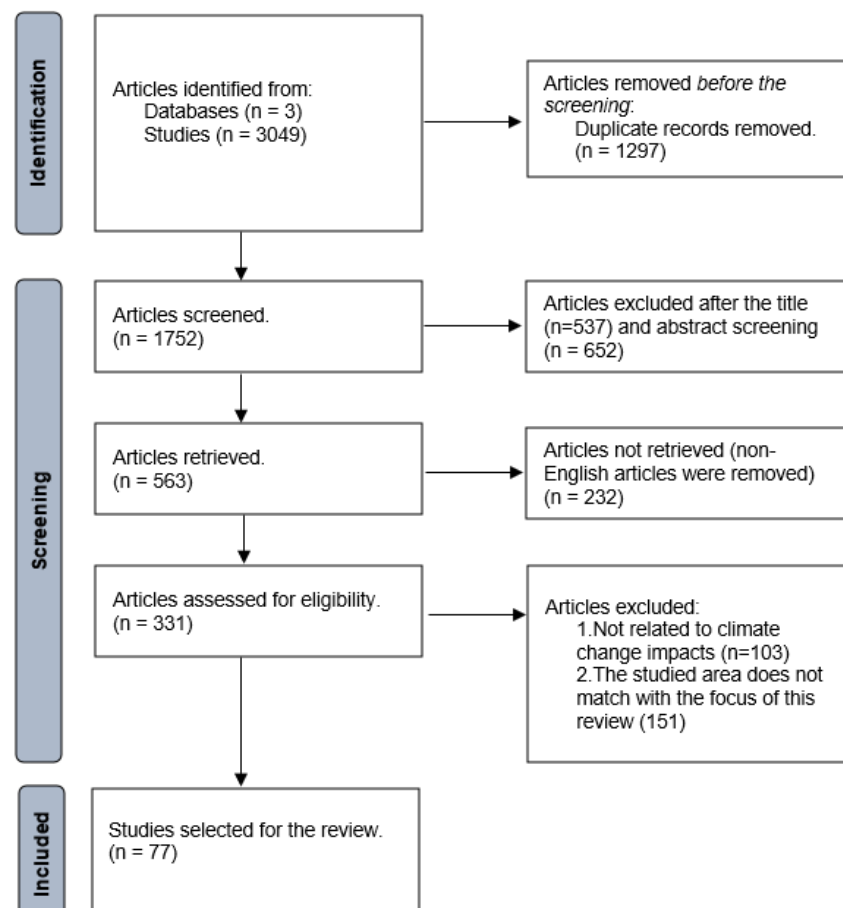


Figure 2. Prisma flow chart for the literature review.

3. Climate Change Impacts on Tourism

Climate change refers to long-term changes in temperature and weather patterns, which are caused principally by the global warming potential of fossil fuel emissions [14,15]. Changing temperatures, shifting seasons, precipitation patterns, intensity/frequency of extreme weather events, coastal erosion resulting from storm surges, and ocean acidifica-

tion are all impacts of climate change that will bring vulnerabilities to the tourism industry of PEI [16]. Prince Edward Island's economy is driven in large part by three industries: agriculture, fisheries, and tourism. While the island's economy is diverse, changes in temperature, precipitation, extreme events, and ocean acidity will have a significant impact on inter-annual economic growth [17,18]. In particular, the island's tourism industry is expected to suffer from significant, long-term effects as climate change alters the environment and deters tourists from visiting [19]. As the climate changes, ideal conditions for agriculture and fishing are also at risk, both of which serve as crucial aspects of tourism in PEI [4]. The island is shrinking and sinking simultaneously, taking with it all that is loved by locals and visitors [20]. Impacts most harmful for tourism on the island include coastal erosion, post-tropical storms, heatwaves, heavy precipitation/inland flooding, severe ice storm/freezing rain, earlier/warmer springs, and seasonal drought (Figure 3) [15,21–23]. This review will further investigate how climate change impacts tourism on the island and suggest a future direction and areas of study as a solution.



Figure 3. Illustration of the climate-related challenges for PEI's tourism sector.

3.1. Coastal Erosion

As mentioned above, Prince Edward Island is known for its scenic, sandy beaches, towering dunes, red soil cliffs, and coastal beauties, such as sand dunes and coastal activities, all of which are threatened by ongoing coastal erosion [24]. As an island surrounded by two bodies of water—the Northumberland Strait and the Gulf of St. Lawrence—PEI is susceptible to raging sea waters that beat away at its shoreline [2,25]. As climate change progresses, it brings about more intense and frequent storm surges and sea level rise, causing aggressive coastal erosion [20]. Coastal erosion has a disastrous impact on the island's tourism and recreation industries, resulting in smaller beaches, less access to parks, monuments, golf courses, and other resources, and endangered tourist attractions [26]. World-famous island beaches, such as Cavendish, Brackley, and Basin Head, are rapidly losing territory as strong wave action erodes the fragile coastline, stealing lounging space, sand dunes, red cliffs, and accessibility equipment (e.g., wheelchair ramps, mobility beach mats, etc.). As coastal wetlands deteriorate, erosion results in habitat loss for ecosystems [27], posing a threat to the plants and animals that rely on these environments [28]. For instance, PEI's coastline features serve as a critical habitat for several endangered species, including the migratory

piping plover (*Charadrius melodus*) that nests in open cobble beach areas and bank swallows which nest in colonies in the slopes of shoreline banks, sand dunes, and cliffs. The foghorn station at East Point was moved inland several years ago for preservation purposes and this included many of the lighthouses on PEI, among the most visited tourist attractions [20,22]. To limit the erosion of the nearby sand dunes at West Point, barriers have been built over the past year [22]. After erosion pulled the tower of the Cape Bear lighthouse to within two meters of the cliff in 2014, it was moved 20 m inland [20]. Each year, the coastline is becoming steeper and more unstable, threatening tourist attractions such as lighthouses, museums, and other businesses that attract tourists [29]. To address the coastal erosion problems in PEI, the Government of PEI included in its climate action report shoreline protection measures, including hard and soft shoreline protection methods [30]. Islanders are also being given advice on how to stabilize the coastlines near their properties [30]. Future studies should investigate how coastal protection of PEI might improve beach tourism on the island and may encourage research on how islanders can better cope with climate change impacts.

3.2. Earlier and Warmer Springs

The direct consequences of climate change on tourism are caused by the fact that a destination's climate is a sum of the weather experienced by tourists [31]. In this regard, climate has a direct impact on tourism demand as well as tourist behavior and spending. Travelers' decisions to participate in an activity, as well as the quality of their experiences, are influenced by atmospheric conditions [32]. On average, Prince Edward Island has a mild climate due to the warm waters from the Gulf of St. Lawrence. Oftentimes, cool winters leave the spring season wet and chilly, causing locals to stay indoors and visitors to wait for the bustling summer season. However, climate change is bringing about earlier and warmer springs, cutting winters short and extending the spring tourism season in PEI [17,33]. On the plus side, the extension will bring more people to the island for a longer length of time and will inspire locals to do the same. Due to the increase in tourists at this time, organisations such as Parks Canada and summer island enterprises such as Blue Mussel Cafe and Flavour Mountain Candy Company will be able to open their attractions sooner, which will benefit economic growth. Other sectors, such as agriculture, fisheries, and aquaculture, will have opportunities to grow and diversify as the island's spring climate warms earlier; this will have an impact on the tourism sector as tourists visit PEI for its unique agricultural heritage, diverse fisheries, and high-quality aquaculture. However, as the spring season changes, winter tourism is threatened due to a shortened season. Winter resorts are particularly affected by rising temperatures and uncertain snow conditions as a result of climate change [23,34]. These changes are also expected to have an influence on winter activities, as conditions for skiing, snowboarding, snowmobiling, skating, snowshoeing, and cross-country skiing are available for shorter periods of time. During the winter season, Mark Arendz Provincial Park, the PEI Snowmobile Association, and Mill River Resort rely heavily on locals and visitors. Consequently, warmer and earlier island springs might be expected to provide chances for summer companies to extend their season and tourism but can also provide challenges for winter attractions when snow cover falls, and temperatures rise above historical averages. Tourism indicators can be customized to the needs of individual visitor activities, allowing for better tourism planning and decision making.

3.3. Post-Tropical Storms

Post-tropical storms in Prince Edward Island bring about devastating destruction to natural resources and infrastructure from strong winds and storm surges, both of which the island has seen recently with Hurricane Dorian (7 September 2019) and Hurricane Fiona (24 September 2022) [22]. With intensifying impacts, post-tropical storms have severe implications for tourism due to debris, road closures, downed power lines, and fallen trees, leading to limited access to attractions, cancellation of events/trips, and park/attraction

closures. Peak hurricane season and peak tourism season on the island closely overlap, bringing a negative economic impact by forcing the closure of tourist attractions on Prince Edward Island during the height of the season [21]. As climate change manifests, peak hurricane season may extend into July, putting island tourism at an even greater risk. Many parks, campgrounds, trails, and golf courses were closed for several days, and in some cases for several weeks, because of post-tropical Storm Dorian [34]. The PEI National Park, Cedar Dunes Provincial Park, Panmure Island Provincial Park, Cabot Beach Provincial Park, Stanhope Campground, and Confederation Trail were impacted again during Hurricane Fiona this past year. On 7 September and into 8 September 2019, Prince Edward Island was impacted by post-tropical Storm Dorian [21] which brought hurricane-force winds (121 km/h, gusts of 146 km/h along the north shore), heavy rain (138 mm), and extreme storm surges of 1.6 m above the anticipated tide level [21]. Such conditions resulted in the loss of power for days to nearly 80% of islanders, a net loss in beachfront areas (3–5 m in some locations), and the closure of most campgrounds in the province. On 24 September 2022, Prince Edward Island was hit by post-tropical Storm Fiona. During Fiona, The Mi'kmaq Confederacy of PEI's climate station at Red Head recorded a peak wind speed of 133 km/h, a peak water level that was 2.69 m above the tidal reference point, and nearly 100 mm of rainfall. The top wind speed recorded on the island was 150 km/h [21]. Approximately 90% of islanders lost power due to Hurricane Fiona for weeks and many tourists were stuck on the island. Many of the areas in and around the towns of Cavendish, North Rustico, Brackley, Dalvay, and Greenwich looked as if they had been struck by lightning. The beaches, the island's tourist spots, were also severely damaged. The hurricane also caused damage to Green Gables Heritage Place and many other tourist attractions, such as Bonshaw Hills, Lennox Island, Greenwich Interpretation Center, and Greenwich Beach. The effects of Hurricane Fiona on the island are still to be analyzed and documented by climate scientists and environmental researchers. For storm events such as Hurricane Fiona, early warning systems [35] and preparation guidelines should be emphasized for the islanders and the tourists. Emergency shelters and equipped community centers (charging stations, water, and food availability, warming centers, etc.) must be ready for such events so that the tourists who are stuck on the island can also benefit from these centers. Such extreme events must inform policy and take into account tourist safety and tourism continuity.

3.4. Heatwaves

Extended periods of above-average temperatures driven by climate change may cause temporary, small-scale delays to tourism and recreational activities due to imposed health and safety risks, potentially lowered access to water, and recommendations to stay indoors [36]. In a positive vein, while rising temperatures are likely to extend the island's tourism season, the quality of their stay may be compromised due to rising temperatures and heat stress [37]. During heatwaves, islanders and visitors may be less likely to spend time at outdoor attractions, parks, or non-air-conditioned indoor events, leading to major declines in attendance, which could influence employees [38]. With an increase in the frequency and intensity of heatwaves expected for PEI [39], it is reasonable to expect a reduction in tourists at outside attractions on PEI, reducing the amount of profit that hotels collect because people may choose not to travel in extreme heat, visit beaches/parks, or other outside attractions [34,40]. Given that many of PEI's tourist attractions are outdoors, the province may be especially exposed. Due to increased physical strain and changes in mental state during a heatwave, people are more prone to suffer from reduced productivity and heat-related illnesses, which also raises the chance of accidents or injuries [41]. According to Environment Canada, a five-day heatwave in July 2022 led the province administration to issue cautions for outdoor activities as temperatures surpassed 31 °C with excessive humidity, and islanders/visitors were recommended to stay indoors. However, policy implementations are weak in PEI for tourism administration to maintain sustainable tourism or enable tourists to stay safe during these unexpected and extreme events. The

policy should encourage the building of cooling centers for summer and warming centers for visitors around the island during the winter, which could be very important and may be incredibly helpful and enable islanders and tourists to freshen up and continue their trips [42].

3.5. Seasonal Drought

Dry, hot, dusty conditions are becoming more frequent and harsh as climate change continues to threaten all aspects of life, including the tourism industry [43,44]. Drought, as well as recreationists' negative opinions of drought, fire restrictions, or wildfires, may result in fewer visits, more hotel cancellations, fewer booked vacations, or lower goods sales [45]. Decreased industry earnings can have a detrimental impact on the livelihoods of communities and the many small outdoor recreation firms that have limited means to manage the financial burden of drought. This, in turn, has an impact on the mental well-being of small business owners, employees, and communities. Modeled projections of drier, warmer conditions across Atlantic Canada will have implications for the tourism industry in PEI [45]. Golf courses, gardens, and certain tourist destinations connected to agriculture can expect to experience disruptions in the future due to drought [39]. Golf course owners' capacity to utilize irrigation may be hampered if prolonged drought results in water consumption limitations [46]. The impact of drought on crops may have an influence on some tourist destinations with agricultural aspects, such as the Orwell Corner Village Historic Site Farm and Greenwich National Park. Drought events may lessen PEI's natural attractiveness, particularly in public gardens such as those at The Dunes Studio Gallery and Café and flowering potato crops, which may impair visitor satisfaction [47]. Drought conditions are likely to interfere with tourism activities as the environment becomes extremely dry, making it highly susceptible to wildfires and wilting vegetation. Events, such as the PEI fireworks festival which attracts many tourists, may be canceled due to drought conditions, and some activities, including campfires and bonfires, may be outlawed due to extremely dry vegetation increasing the chances of fires [48]. As of 31 August 2020, the Canadian Drought Monitor classified much of central PEI as being in a severe drought [49,50]. Although September has seen more rain than usual, the first half of the month has only received approximately half the usual amount, showing signs of the increased drought on the island [50]. Drought can have far-reaching consequences for recreation and tourism, such as reduced availability of outdoor recreation activities (e.g., skiing), lower attendance owing to drought perceptions, and financial losses for businesses, communities, and government agencies [34,45]. Early warning and proactive drought planning are critical for businesses and communities to mitigate drought consequences and become drought resilient [46,51]. The PEI government should: (1) observe and monitor droughts; (2) plan for and prepare for droughts; (3) predict and forecast droughts; (4) communicate with the public and impacted sectors; and (5) conduct multidisciplinary application research on subjects of interest to drought-affected sectors.

3.6. Heavy Precipitation and Inland Flooding

Floods during busy seasons endanger and disrupt tourist accommodations, putting them out of commission [52]. Those who are not impacted gain from increasing tourist demand and new job opportunities in the hotel industry. Concerns about the availability of flood mapping and flood control strategies for tourism firms were raised with the destruction of tourism in the province. Flooding has a broader impact on the ecosystem and on nearby local communities, indicating an increasing problem for the future [53]. Projections of greater average rainfall and more frequent/extreme inland flooding events are likely to have implications for the tourism industry on Prince Edward Island. Evidence suggests that the biggest threat to the tourism industry and leisure sector posed by severe precipitation and flooding is most likely the inability to access popular tourist attractions on PEI [54]. As a low-lying island, PEI is prone to coastal and inland flooding, and road closures and hazardous situations have recently disrupted travel plans and restricted

visitor access to major tourist attractions on PEI [8]. For instance, road washouts brought on by two independent storms in March 2013 restricted access to at least one entrance to PEI National Park, temporarily closed the Confederation Bridge, damaged properties, and caused power outages in over 1000 homes. A storm on 14 March 2013 brought heavy precipitation across PEI, causing flooding overnight and serious damage to both properties and belongings [15,55]. Almost two weeks later, on 26 March 2013, PEI was hit by a spring storm that brought blizzard-like conditions and reduced visibility, along with hurricane-force wind gusts and significant snowfall from Wednesday into Thursday. PEI was blanketed with 53 cm of snow in some regions and wind gusts of 100 km/h, causing power outages in over 1000 island homes and the Confederation Bridge to close for the day. Additionally, it could be difficult for staff members to get to tourist or recreation areas, which might cause destination closure times to last longer [56]. Periods of heavy rainfall also occur during the late summer and early fall months, coinciding with the peak season of cruise ships docking on PEI [34,57]. The coastal low-lying golf courses on PEI have closed during periods of heavy rains in the past [23] which affected revenue. As golf courses are closed during moderate and heavier precipitation events, the golfing sector may be impacted by prolonged heavy precipitation regardless of flooding situations. Intense precipitation combined with inland floods triggered by climate change will have a substantial impact on island tourism by prohibiting people from visiting tourist destinations. Tourism managers may have difficulties in preparing for the management and adaptation process, as it relates to quantifying the flooding impacts in order to extract the greatest benefits [58]. Flooding impacts can be successfully controlled if the drivers of the impacts are thoroughly understood and appropriate adaptation methods and policy choices are in place [59]. Plans for flood control attempt to mitigate hazards at all levels of society and the environment [60]. Flood risk management strategies help to promote flood vulnerability to regulate and mitigate structural damage using non-structural measures [61]. Future flood risk management studies and flood adaption models will help determine how much change and development is required to justify tourism development zones [60]. Tourist enterprises in flood-prone areas should measure and manage floods to identify flood safety elements, resilience, and resistance of both new and existing infrastructure [60]. Management should alter rules to build control during flooding periods, flood forecasts, risk area retreats, and review and adapt to new management guidelines on a regular basis [62]. Tourism locations must emphasize the importance of including tourists, tourism firms, enterprises, and local residents in flood risk management [63].

3.7. Severe Ice Storms and Freezing Rain

In general, for winter tourism on the island, ice storms and freezing rain have an influence on tourism and recreation by temporarily restricting travel and making outdoor activities dangerous [31,64]. Any object below freezing will be covered in an ice layer created by freezing rain; if this freezing rain persists for many hours or longer then it is defined as an ice storm [11,64]. The main effect of ice storms, the loss of electricity, has an indirect impact on all aspects of the economy during island winters. For example, an ice storm in January 1998 created perilous circumstances that discouraged anyone from traveling by air to and from Prince Edward Island [65]. There may be cascading effects on air travel in Prince Edward Island due to winter-related travel bans and delays in central Canada [1,66]. These incidents may interfere with the accessibility and upkeep of winter tourism attractions. Freezing rain and ice storms have the potential to keep visitors indoors because driving is prohibited or strongly discouraged, resulting in a drop in attendance or closure of tourist sites, activities, or events, as well as a drop in visitors to the island entirely due to delays, bans, and restrictions.

4. Tourism and Sustainability

As highlighted earlier, tourism is one of the main economic drivers for the province of PEI [10]. Beginning in the 1800s, islanders began to market the intrinsic beauty of the

province. On the island, tourism has many benefits, including employment opportunities, improved infrastructure, awareness and appreciation of culture and diversity, and acknowledgement of the unique qualities of an area. Furthermore, the population of PEI grows significantly throughout the summer, peaking in July and August, with a projected 1.2 million visitors in the 2022 summer giving opportunity to many islanders to seek jobs and be employed. This traffic through the island is record breaking and extremely positive; however, we need to consider what this means for the environment and sustainability [67]. It is crucial to remember that tourism can have negative consequences, such as increased real estate expenses for the local population, environmental harm, and unpredictability of tourist numbers based on a variety of factors. Such unpredictability is concerning for local citizens' livelihoods and environmental harm could destroy the very features that attract tourists to the island. As it develops a climate change strategy, the tourism industry on PEI has a two-pronged problem: coastal erosion and vulnerable infrastructure near the shore, particularly park infrastructure. It can be useful to look at the efforts to determine what is already being achieved or might be undertaken on the island to adapt tourism to the impacts of climate change.

Efforts of Sustainable Tourism on PEI

In the face of changing climate impacts, Prince Edward Island is making progress in protecting its natural beauty while maintaining its tourism industry and making efforts to be more sustainable [68–70]. As an example, throughout the island there are several electric vehicle (EV) charging stations, making the island environmentally friendly and more accessible to EV owners [71]. There are a total of 49 public charging stations across the province, with Summerside and Charlottetown each having 19 stations. The number of stations may seem limited, but it may be proportional to the number of island residents and expected visitors that have EVs [72,73]. Another way PEI is making steps towards sustainability and thus sustainable tourism is the increased use of renewable energy. Wind, solar, and biomass energy sources are becoming an increasingly popular energy source in the province. The provincial government of PEI has been working to create rebate programs for residents and businesses for increased energy efficiency and renewable sources [74]. For example, there are rebates available for heat pump and solar panel installation, both for private homes and businesses or farms. The accessibility of renewable energy to businesses across the island could help cut energy costs for small business owners and provide yet another draw to visitors.

While PEI has taken many beneficial steps towards a more sustainable tourism industry, there are still many things that can improve the current practices. First, PEI has over 25 golf courses, yet none of them are Audubon certified as wildlife sanctuaries [75]. If this certification were reached, environmentally conscious golfers may be more inclined to visit, as the only two certified courses in Atlantic Canada are in Cape Breton and New Brunswick. Another step could be to improve public transportation. Electrifying buses, increasing bus routes to rural areas, and improving ride-share programs could help tourists and residents to see more of the island without the impact or cost of renting and driving a car [76]. Additionally, the improvement of bicycle lanes would make it easier to use that mode of transportation, which is a very enjoyable and common tourist experience in spring and summer seasons.

Viewing wildlife and marine life is a huge attraction for tourists during the summer, but it can impose a burden on the wildlife. Putting restrictions on how close people can go to wildlife will reduce stress on the animals and environmental destruction, while also preserving the population for future visitors to enjoy. It is also crucial that visiting tourists are cognizant of their visit and make a conscious effort to have little effect on the island while they are here, possibly by renting a room from Green Island Getaways, a 100% eco-friendly and sustainable "holiday getaway". Moreover, visitors should remember they are visiting someone's home, whose residents love the island as much as they do and want it to withstand tourism for a long time. The most important thing the province of PEI

can do to ensure sustainable tourism is to protect and provide for its residents, culture, and environment. Tourism is engrained in the fabric of PEI; it is a sustaining factor of the island which would suffer without the annual visitors. However, if local businesses and attractions are not provided with necessary support to carry on, it will not only be the local businesses that will dwindle but also the number of visitors.

5. Policy Implications and Adaptation

It is obvious that all tourism locations will need to adjust to climate change, whether to reduce risks or capitalise on new opportunities related to local climate change impacts or effects on rivals and the broader tourism industry [77,78]. Climate change adaptation has become a focal point for policymakers on PEI, reflected in a large increase in policy documents and reports focused on building climate resilience from all levels of government and organizations on the island [15]. These reports, studies, plans, and strategies cover a wide range of jurisdiction on PEI—from individual towns of less than a hundred people to those encompassing the entire island (Figure 4). Although these policies may not specifically target sustainable tourism, their broad scope of action proves beneficial in driving changes across multiple sectors, which is sorely needed in developing something as intersectional as sustainable tourism. Existing policies will be analyzed under three levels of hierarchy in this section: provincial, municipal/community, and organizational levels.

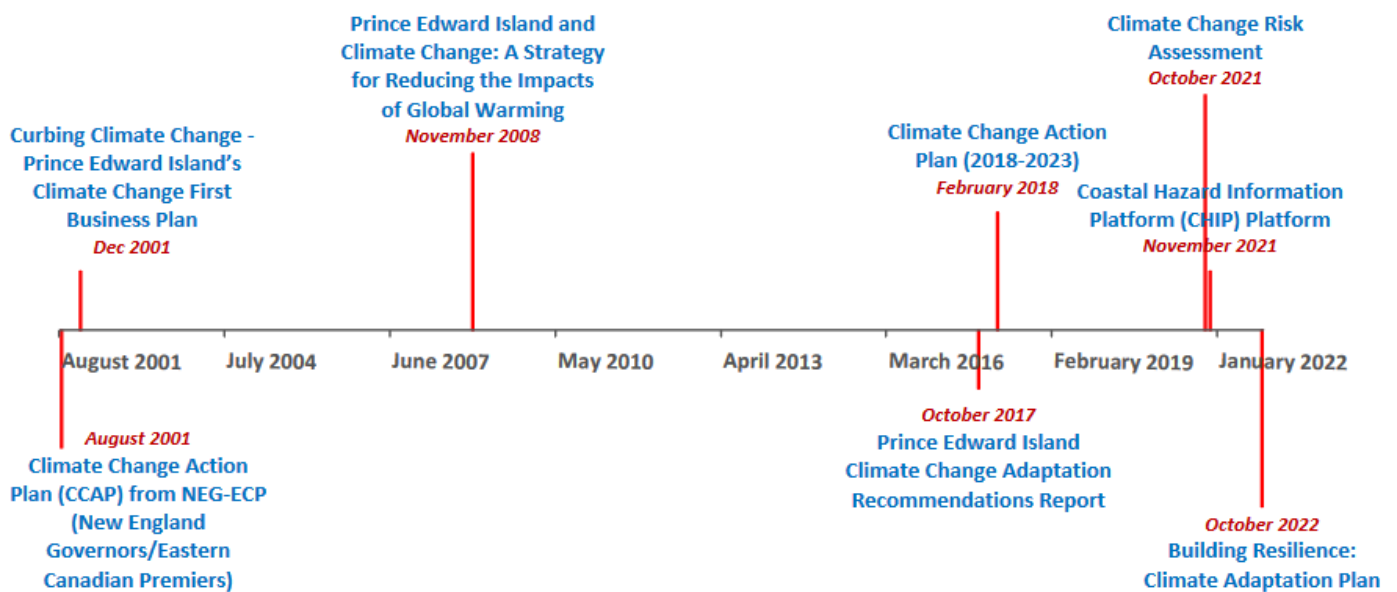


Figure 4. Timeline of significant provincial policy documents released on climate change. An increase in the release of policy documents can be observed starting in October 2017.

5.1. Provincial Policy

A major advancement in climate change adaptation policy for the province of PEI was released in October 2022 entitled “Building Resilience: Climate Adaptation Plan” (The Climate Adaptation Plan provides a solid road map for the province to better prepare for the future while mitigating the effects of climate change on Islanders. <https://www.princeedwardisland.ca/en/publication/building-resilience-climate-adaptation-plan>, accessed on 20 November 2022). It is the most recent policy piece analyzed in this report and likely the one of the most pertinent. In this plan, 28 individual actions are identified as potential adaptation strategies under six themes: (1) disaster resilience and response, (2) resilient communities, (3) climate-ready industries, (4) health and mental wellbeing, (5) natural habitat and biodiversity, and (6) knowledge and capacity building. Each of these categories and actions are relevant to ideals of sustainable tourism, yet tourism itself is mentioned only once within the document under policy Action 13, which outlines government strategies to respond to climate risks in relevant sectors, including tourism. In

this section, the provincial government pledges to support tourism and other industries through guidance and support, such as identifying priority risks for tourism and adjusting sectoral programmes and supports to future realities, as well as funding, where they hope to establish a funding programme in partnership with the federal government to allow for innovation in technologies and best practises for each sector. Furthermore, Action 13 addresses potential provincial government help for industry sectors in the event of a catastrophic storm or emergency, most likely caused by Hurricane Fiona. Of course, this is not the only action in the text that is relevant to sustainable tourism. Other actions relevant to sustainable tourism include the creation of a provincial land use plan, strengthening building codes and standards, expansion of critical infrastructure vulnerability assessments, and the creation of adaptation plans for at-risk historical, cultural, and archaeological assets. The document proposes a roadmap of adaptation planning within the province; however, at a very high, broad level. More precise policies outlining how this approach will be implemented to aid tourism on the island will need to be further evaluated in the future.

Another critical piece of provincial policy in climate adaptation planning is in its *Climate Change Risk Assessment* (CCRA) (PEI recently concluded a province-wide climate change risk assessment (CCRA). A risk assessment assists the province in better understanding climate-related threats in PEI and developing appropriate response actions. <https://www.princeedwardisland.ca/en/publication/pei-climate-change-risk-assessment-2021>, accessed on 20 November 2022), released in July 2021. This document proves highly important to climate change adaptation on the island as it provides the foundation for adaptation planning in the future and will inform decision making for most policies. Furthermore, it identifies and builds on the understanding of key climate impacts to social, environmental, health, economic, and cultural aspects of the province, all of which are highly relevant to sustainable tourism. The assessment identifies impacts in tourism and recreation as a key consequence to unmitigated climate change, which include narrowed beaches, and restricted access to national parks, historical landmarks, golf courses, and other resources, due to erosion and sea level rise. Coastal erosion, post-tropical storms, heavy precipitation, flooding, and earlier, warmer springs were rated in the document as being the most impactful to tourism. In terms of adaptation, the document does not explicitly mention tourism when rating the adaptive capacity of different consequence categories of concern. However, it does outline some emerging adaptation policies that are relevant to sustainable tourism, such as improving ecosystem and biodiversity health (particularly in coastal regions), increasing climate resilience in critical transportation and infrastructure, and increasing capacity for emergency repair, response, and supplies. A common theme across the report is that confidence ratings for risk and adaptive capacity for the tourism sector is overall very low, due to its intersectionality and lack of high-quality, independent evidence. More research is needed specifically on tourism impacts in PEI for more effective policy and adaptation for sustainable tourism.

The *Climate Action Plan for Prince Edward Island (2018–2023)* (<https://www.fao.org/faolex/results/details/en/c/lex-faoc201418/> <https://www.princeedwardisland.ca/en/publication/climate-change-action-plan-progress-report-2018-2019>, accessed on 12 October 2022) is another significant policy piece developed by the provincial government of PEI. This planning document also has an accompanying progress report published in 2019 and has noted the impacts of the extreme conditions of climate change on tourism industry. Similar to the *Building Resilience* plan released in 2022, tourism is only mentioned once and briefly in this policy. A positive adaptation policy identified in the progress report was an intertidal reef project which had been tested in the Souris causeway. Other policies outlined in the plan are mostly high level and focus on identifying and improving vulnerable infrastructure and improving ecological outcomes.

5.2. Municipal Policy

Municipal policy is plentiful on the island, with communities small and large releasing climate change mitigation and adaptation plans. Municipal or sub-government policies

have advantages over provincial policies in that they can be more targeted to the community's goals and efficient in execution. Notable leaders from PEI municipalities in climate change adaptation are Charlottetown, Summerside, Stratford, and Victoria. The town of Stratford's 2010 *Climate Change and Adaptation Plan for Stratford, PEI* (Climate Change and Adaptation Plan for Stratford, PEI <https://www.cip-icu.ca/files/resources/ccmap-town-of-stratford-complete>, accessed on 20 November 2022) is particularly comprehensive, and focuses specifically on adaptation measures that the municipality can take. In particular, the plan puts an emphasis on community-centered adaptation, where locals can contribute to leading change. However, the town of Stratford is not reliant on tourism as it is a primarily residential community and has different adaptation priorities. Official policy recommendations from the document include adjusting zoning bylaws to allow for the proper setback of infrastructure from vulnerable coastal areas, temporary usage of sea walls where vital infrastructure exists, and deeper lots for development near coastal zones [54,79]. There also exists policies for storm, waste, and potable water management, although these do not specifically target tourism.

The municipality of Victoria, whose economy is more reliant on tourism, does mention it in their *Climate Change Vulnerability Assessment*, although some policies are not specifically tailored towards improving the tourism experience. Significant policies found here include an improved wastewater treatment system, performed in 2008. A central land-based effluent dispersal system was installed, which eliminated waste discharge from entering Victoria harbor as well as sewage backup during storm events. This system was also capable of handling flow capacity increase during the tourist season. Shoreline protection has also been implemented as an adaptation policy; however, its effectiveness is unclear, and its aesthetic quality is unattractive for tourists entering the town. Future adaptation options Victoria proposes include an emergency management plan during severe storm events and the creation of a municipal coastal setback bylaw, similar to the town of Stratford. The setback bylaw would go beyond provincial requirements and help preserve cultural infrastructure so that tourists continue coming to Victoria while residents maintain their livelihoods. Another interesting policy proposed in the document are their retreat, abandon, or protect strategies, all of which have advantages and disadvantages for maintaining sustainable tourism in the municipality.

Lastly, Charlottetown and Summerside both released *Climate Risk and Resilience Recommendations* reports as part of the Municipalities and Utilities Partnering for Resilience project. These plans identify a need for plans to deal with tourist peaks and evacuees from other communities during storm events. With the recent severe storms/post-tropical hurricanes that have hit PEI in the past years, municipalities that see major peaks in population numbers during the tourist season—such as Charlottetown and Summerside—have also released climate risk and resilience recommendation reports that address emergency plans for future storms, improving assurance of the safety and preparedness of the community. These emergency plans must be able to accommodate extra people from tourism and establish necessary and improved communication protocols between the city and tourist businesses/accommodations.

5.3. Organizational Policy

Organizational policies exist in the Prince Edward Island National Park, which is directed by Parks Canada. Other organizations for tourism also exist on the island, such as the Tourism Industry Association of Prince Edward Island (TIAPEI), Tourism PEI, and EfficiencyPEI.

Two significant policy pieces from TIAPEI and Tourism PEI have been released recently: the April 2022 *Tourism Workforce Action Plan* (Tourism Workforce Action Plan, TIAPEI. <https://www.tiapei.pe.ca/wp-content/uploads/2022/06/TIAPEI-Final-Strategy-Report.pdf>) and *Charting the Course of Tourism in PEI For the Next Two Years* (Charting the Course of Tourism in PEI, Tourism PEI. https://www.princeedwardisland.ca/sites/default/files/publications/tourism_strategy_2022-23_web.pdf, accessed on 12 December

2022), respectively. These plans do not mention climate change but do mention sustainability as a focus of development in the future. Tourism PEI also has policies that target climate change within its land management, marketing, and tourism practices. The organization manages several campgrounds and golf courses across the island where they utilize seawalls and coastal defenses, including a “Living Shorelines” initiative to supplement natural dune systems to adapt to rising sea levels (K. Hansen, personal communication, 10 November 2022). To address these challenges, the current report recommends that PEI managers invest in strong infrastructure and develop strategies to mitigate the effects of climate change on the tourism economy. Tourism PEI also aids in coordinating research and development of policy for organizations involved in tourism across the island through the lens of climate change adaptation and mitigation (K. Hansen, personal communication, 10 November 2022).

EfficiencyPEI is a service agency of the PEI Energy Corporation, a crown corporation of the provincial Department of Environment, Energy, and Climate Action. EfficiencyPEI contributes to developing sustainable tourism on PEI through policies for incentives for businesses to mitigate climate change through improving energy efficiency and renewable usage (T. Campbell, personal communication, 29 October 2022) [80]. The organization also contributes to building resilience to climate change through energy audits that consider climate hazards, such as flood and storm risks, which can be performed on an individual business to the community-level scale (T. Campbell, personal communication, 29 October 2022). This increased stringency in energy efficiency, as well as improved resilience from audits, may aid businesses in the tourism sector to adapt to energy and infrastructure risks posed by climate change in the future.

PEI’s National Park is another important policy director for sustainable tourism on the island and is focused on adapting the park to climate impacts in the future. Policies from the national park are delineated in its *Climate Change Strategy 2022–2027*, and its *Management Plan 2017*. Although specific adaptation policies are not specifically stated, some that currently exist include the relocation of vulnerable infrastructure and the improvement of climate resilience in buildings. This relocation effort entails the shifting from hard structures to non-structural approaches to better align with a changing coastline (L. Charron, personal communication, 28 October 2022). Furthermore, the park has invested in coastal structural adaptation efforts, such as hard shoreline protection and softer measures with living shorelines and dune reconstruction. Many management plans currently in the park also consider climate change, such as their forest management plan, which hopes to restructure forests in the park to include more resilient plant species in the future in more sustainable touristic locations [81]. Other initiatives include improved monitoring and analysis of climate impacts on the park, including the implementation of the resist-accept-direct (RAD) framework to identify adaptation options within the park. The National Park also emphasizes adaptation to adopt a two-eyed seeing approach, where Indigenous perspectives to climate change adaptation are integrated into planning. Education and community outreach are also emphasized as key to improving sustainable tourism and adaptation goals.

6. Concluding Thoughts

In recent years, the interaction between climate change and tourism has been one of the most crucial and dynamic study areas in the field of sustainable tourism, yet regional strategies are still lacking. Although PEI adaptation policies promote climate resilience and sustainability, there is little attention and no credible research on how climate change will affect tourism on the island or what actions would be taken to protect tourism. Understanding climatic changes is a first step towards managing them and adapting to new circumstances. More research on the critical concerns of climate change and sustainable tourism is needed to document the impacts on tourism and influence future research and policy. Tourism’s response to climate change is vital to its long-term viability, and the industry will suffer tremendously if it withdraws from climate change knowledge or prepa-

ration. Uncertainty is a well-known challenge in climate change mitigation and adaptation decisions, and the impact on tourism has yet to be reported. Long-term (over 10–20 years) assessments of the effects of climate change on the tourist system must be documented and questioned. These are complicated issues that will necessitate the development of innovative ways to better understanding and reduce uncertainty caused by climate change extremes to the greatest extent possible.

Understanding how climate change will interact with other long-term social and market trends influencing tourism demand should be a goal for the island tourism department, tourism authorities, researchers who undertake interdisciplinary work in sustainability and climate change and other scholars. Tourism researchers should consult climate scientists for information on how the climate system may evolve in response to various anthropogenic and natural forcings and feedbacks in the climate system. Tourism has frequently borrowed concepts and practices from a wide range of academic disciplines, and it should continue to do so in the future for PEI. A greater emphasis on community-based research in tourism and climate change could lead to better long-term solutions to the highly contextual adaptation difficulties posed by climate change uncertainties. In government reports on climate change adaptation and planning, as well as gaps in research and policy implementation, tourism must be identified as a threatened industry. Further detailed rules defining how to aid tourism on the vulnerable island will need to be considered further in the future. The only limitation of this study is the two-decade window used to screen eligible literature (2000–2022), but this approach was justified given the preliminary nature of this topic prior to this time period. More research is needed when it comes to climate change impacts on tourism in PEI. Future research on tourism and sustainability on PEI could concentrate on policy formulation and investigation of high-level policies aimed at identifying and improving vulnerable infrastructure and improving ecological outcomes, which can greatly benefit tourism on the island and create pathways to sustainability.

Author Contributions: Conceptualization, P.K. and X.W.; validation, X.W. and P.K.; investigation, E.H., Z.F., N.K., L.M. and P.K.; resources, E.H., Z.F., N.K., L.M. and P.K.; writing—original draft preparation, E.H., Z.F., N.K., L.M. and P.K.; writing—review and editing, P.K. and R.G.; visualization, P.K., X.W. and R.G.; supervision, X.W. and P.K.; project administration, P.K. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: Data could be made available upon request.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. MacDonald, E. A Landscape . . . with Figures: Tourism and Environment on Prince Edward Island. *Acadiensis* **2011**, *40*, 70–85.
2. Baldacchino, G. Islands and the Sea. In *The Palgrave Handbook of Blue Heritage*; Springer: Berlin, Germany, 2022; pp. 25–30.
3. Gothie, S.C. Playing “anne”: Red braids, green gables, and literary tourists on Prince Edward Island. *Tour. Stud.* **2016**, *16*, 405–421. [[CrossRef](#)]
4. MacDonald, E.; MacFadyen, J.; Novaczek, I. *Time and a Place: An Environmental History of Prince Edward Island*; McGill-Queen’s University Press: Halifax, NS, Canada, 2016; Volume 5.
5. MacDonald, E.; MacEachern, A. Rites of passage: Tourism and the crossing to Prince Edward Island. *Hist. Soc./Soc. Hist.* **2016**, *49*, 289–306. [[CrossRef](#)]
6. Baird, D.M. *Prince Edward Island National Park: The Living Sands*; Queen’s Printer: Ottawa, ON, Canada, 2022.
7. Heung, B.; Keys, K.; Burton, D.L.; Lynch, D.H. *Soils of the Atlantic Provinces*; Canadian Society of Soil Science: Pinawa, MB, Canada, 2021.
8. Khirfan, L.; El-Shayeb, H. Urban climate resilience through socio-ecological planning: A case study in Charlottetown, Prince Edward Island. *J. Urban. Int. Res. Placemak. Urban Sustain.* **2020**, *13*, 187–212. [[CrossRef](#)]
9. McIsaac, I. *Factors Influencing Change in the Prince Edward Island Lobster Fishery*; University of Prince Edward Island: Charlottetown, PE, Canada, 2021.
10. MacIntyre, J. *Agroecological Farming Methodologies as Climate Change Resilience on Prince Edward Island, Canada*; University of Guelph: Guelph, ON, Canada, 2021.

11. Catto, N.; MacQuarrie, K.; Hermann, M. Geomorphic response to Late Holocene climate variation and anthropogenic pressure, northeastern Prince Edward Island, Canada. *Quat. Int.* **2002**, *87*, 101–117. [CrossRef]
12. Vasseur, L.; Catto, N. Atlantic Canada. In *From Impacts to Adaptation: Canada in a Changing Climate 2007*; Lemmen, D.S., Warren, F.J., Lacroix, J., Bush, E., Eds.; Government of Canada: Ottawa, ON, Canada, 2008; pp. 118–170.
13. Ollerhead, J.; Davidson-Arnott, R.; Johnson, P.; Walker, I.; Hesp, P. Seasonal variations in a beach and foredune system, Greenwich dunes, Prince Edward Island national park. In *Proceedings, Canadian Coastal Conference*; Queen's University: Kingston, ON, Canada, 2003.
14. Malla, F.A.; Mushtaq, A.; Bandh, S.A.; Qayoom, I.; Hoang, A.T. Understanding climate change: Scientific opinion and public perspective. In *Climate Change*; Springer: Berlin, Germany, 2022; pp. 1–20.
15. Vasseur, L.; Thornbush, M.J.; Plante, S. Engaging Communities in Adaptation to Climate Change by Understanding the Dimensions of Social Capital in Atlantic Canada. *Sustainability* **2022**, *14*, 5250. [CrossRef]
16. MacEachern, A.; MacDonald, E. *The Summer Trade: A History of Tourism on Prince Edward Island*; McGill-Queen's University Press: Halifax, NS, Canada, 2022.
17. Bhatti, A.Z.; Farooque, A.A.; Krouglicof, N.; Peters, W.; Acharya, B.; Li, Q.; Ahsan, M.S. Climate change impacts on precipitation and temperature in Prince Edward Island, Canada. *World Water Policy* **2021**, *7*, 9–29. [CrossRef]
18. Shaw, R. Coastal impacts of Climate Change and sea-level rise on Prince Edward Island. *Environ. Sci.* **2001**, *41*. Available online: <https://www.semanticscholar.org/paper/Coastal-impacts-of-climate-change-and-sea-level-on-McCulloch-Forbes/4817b1b7cf8690eeb23e96e97e976886b4e0eb8c> (accessed on 26 January 2023).
19. Novaczek, I.; MacFadyen, J.; Bardati, D.; MacEachern, K. *Social and Cultural Values Mapping as a Decision-Support Tool for Climate Change Adaptation*; The Institute of Island Studies, University of Prince Edward Island: Charlottetown, PE, Canada, 2011.
20. Fenech, A.; Chen, A.; Clark, A.; Hedley, N. Building an adaptation tool for visualizing the coastal impacts of climate change on Prince Edward Island, Canada. In *Climate Change Adaptation in North America*; Springer: Berlin, Germany, 2017; pp. 225–238.
21. Jardine, D.E.; Wang, X.; Fenech, A. Highwater mark collection after post tropical storm Dorian and implications for Prince Edward Island, Canada. *Water* **2021**, *13*, 3201. [CrossRef]
22. George, E.; Lunardi, B.; Smith, A.; Lehner, J.; Wernette, P.; Houser, C. Storm impact and recovery of a beach-dune system in Prince Edward Island. *Geomorphology* **2021**, *384*, 107721. [CrossRef]
23. Hewer, M.J.; Gough, W.A. Thirty years of assessing the impacts of climate change on outdoor recreation and tourism in Canada. *Tour. Manag. Perspect.* **2018**, *26*, 179–192. [CrossRef]
24. Randall, J.E.; Desserud, D.; MacDonald, K. *State of Rural Canada 2021: Opportunities, Recovery, and Resiliency in Changing Times*; Canadian Rural Revitalization Foundation: Vermillion, AB, Canada, 2015; pp. 57–64.
25. Baldacchino, G. Studying islands: On whose terms?: Some epistemological and methodological challenges to the pursuit of island studies. *Isl. Stud. J.* **2008**, *3*, 37–56. [CrossRef]
26. Phillips, M.R.; Jones, A.L. Erosion and tourism infrastructure in the coastal zone: Problems, consequences and management. *Tour. Manag.* **2006**, *27*, 517–524. [CrossRef]
27. Henseler, C.; Nordström, M.C.; Törnroos, A.; Snickars, M.; Pecuchet, L.; Lindegren, M.; Bonsdorff, E. Coastal habitats and their importance for the diversity of benthic communities: A species-and trait-based approach. *Estuar. Coast. Shelf Sci.* **2019**, *226*, 106272. [CrossRef]
28. Genest, C.; Joseph, M.-C. 88 centimetres of coastal erosion per year: The case of Kildare (Alberton), Prince Edward Island, Canada. *GeoJournal* **1989**, *18*, 297–303. [CrossRef]
29. Davidson-Arnott, R.; Ollerhead, J. *Coastal erosion and Climate Change*; Atlantic Climate Adaptation Solutions Association: Halifax, NS, Canada, 2011.
30. Nelson, E. Assessing the Suitability of Living Shoreline Techniques for Coastal Erosion in Prince Edward Island, Canada. 2022. Available online: <https://library2.smu.ca/handle/01/30892> (accessed on 26 January 2023).
31. Becken, S. The importance of climate and weather for tourism: Literature review. *Land Environ. People.* 2010. Available online: https://www.researchgate.net/publication/47929582_The_importance_of_climate_and_weather_for_tourism_literature_review (accessed on 26 January 2023).
32. Bigano, A.; Goria, A.; Hamilton, J.; Tol, R.S. *The Effect of Climate Change and Extreme Weather Events on Tourism*; Edward Elgar: Cheltenham, UK, 2005.
33. Bhatti, A.Z.; Farooque, A.A.; Krouglicof, N.; Peters, W.; Li, Q.; Acharya, B. Prospective Climates, and Water Availabilities under Different Projections of Environmental Changes in Prince Edward Island, Canada. *Water* **2022**, *14*, 740. [CrossRef]
34. Ruddy, M.; Hewer, M.; Knowles, N.; Ma, S. Tourism & climate change in North America: Regional state of knowledge. *J. Sustain. Tour.* **2022**, 1–24. [CrossRef]
35. Wernette, P.; Houser, C. evidence for geologic control of rip channels along Prince Edward Island, Canada. *Phys. Geogr.* **2022**, *43*, 145–162. [CrossRef]
36. Steffen, W.; Hughes, L.; Perkins, S. *Heatwaves: Hotter, Longer, More Often*; Climate Council: Sydney, Australia, 2014.
37. Maoh, H.; Kanaroglou, P.; Woudsma, C. Simulation model for assessing the impact of climate change on transportation and the economy in Canada. *Transp. Res. Rec.* **2008**, *2067*, 84–92. [CrossRef]
38. Karimi, A.; Mohammad, P. Effect of outdoor thermal comfort condition on visit of tourists in historical urban plazas of Sevilla and Madrid. *Environ. Sci. Pollut. Res.* **2022**, *29*, 60641–60661. [CrossRef]

39. Maqsood, J.; Farooque, A.A.; Wang, X.; Abbas, F.; Acharya, B.; Afzaal, H. Contribution of climate extremes to variation in potato tuber yield in Prince Edward Island. *Sustainability* **2020**, *12*, 4937. [CrossRef]
40. Rajaonson, J.; Tanguay, G.A. An exploratory analysis of the negative environmental impacts of pandemic tourism on Canadian destinations. *Ann. Tour. Res. Empir. Insights* **2022**, *3*, 100071. [CrossRef]
41. Campbell, S.; Remenyi, T.A.; White, C.J.; Johnston, F.H. Heatwave and health impact research: A global review. *Health Place* **2018**, *53*, 210–218. [CrossRef] [PubMed]
42. Widerynski, S.; Schramm, P.J.; Conlon, K.C.; Noe, R.S.; Grossman, E.; Hawkins, M.; Nayak, S.U.; Roach, M.; Hilts, A.S. Use of Cooling Centers to Prevent Heat-Related Illness: Summary of Evidence and Strategies for Implementation. 1917. Available online: <https://stacks.cdc.gov/view/cdc/47657> (accessed on 26 January 2023).
43. Fang, X.; Pomeroy, J.W. Snowmelt runoff sensitivity analysis to drought on the Canadian prairies. *Hydrol. Process. Int. J.* **2007**, *21*, 2594–2609. [CrossRef]
44. Trenberth, K.E.; Dai, A.; Van Der Schrier, G.; Jones, P.D.; Barichivich, J.; Briffa, K.R.; Sheffield, J. Global warming and changes in drought. *Nat. Clim. Chang.* **2014**, *4*, 17–22. [CrossRef]
45. Schneckenburger, C.; Aukerman, R. The economic impact of drought on recreation and tourism. In Proceedings of the Colorado Drought Conference: Managing Water Supply and Demand in the Fime of Drought, Fort Collins, CO, USA, 4 December 2002; pp. 93–97.
46. Wheaton, E.; Kulshreshtha, S.; Wittrock, V.; Koshida, G. Dry times: Hard lessons from the Canadian drought of 2001 and 2002. *Can. Geogr./Géogr. Can.* **2008**, *52*, 241–262. [CrossRef]
47. King, R. Geography, islands and migration in an era of global mobility. *Isl. Stud. J.* **2009**, *4*, 53–84. [CrossRef]
48. Ward, P.C.; Mawdsley, W. Fire management in the boreal forests of Canada. In *Fire, Climate Change, and Carbon Cycling in the Boreal Forest*; Springer: Berlin, Germany, 2000; pp. 66–84.
49. Stocks, B.; Martell, D.L. Forest fire management expenditures in Canada: 1970–2013. *For. Chron.* **2016**, *92*, 298–306. [CrossRef]
50. Beverly, J.L.; Bothwell, P. Wildfire evacuations in Canada 1980–2007. *Nat. Hazards* **2011**, *59*, 571–596. [CrossRef]
51. Nickerson, N.P.; Becerra, L.; Zumstein, P. *Climate Change & Tourism Literature Review*; The University of Montana-Missoula: Missoula, MT, USA, 2011.
52. Chouinard, O.; Plante, S.; Martin, G. The community engagement process: A governance approach in adaptation to coastal erosion and flooding in Atlantic Canada. *Can. J. Reg. Sci.* **2008**, *31*, 507–520.
53. Jongman, B. Effective adaptation to rising flood risk. *Nat. Commun.* **2018**, *9*, 1–3. [CrossRef]
54. Alkema, R. *The Rising Tide: Adaptation to Sea-Level Rise in Charlottetown, Prince Edward Island*; University of Guelph: Guelph, ON, Canada, 2010.
55. Vasseur, L.; Thornbush, M.J.; Plante, S. *Adaptation to Coastal Storms in Atlantic Canada*; Springer: Berlin, Germany, 2018.
56. Campbell, C. Hardened water: The remaking of a coastal city. *Coast. Stud. Soc.* **2022**, 26349817221128407. [CrossRef]
57. Deacon, D.B. *A Small Island Perspective to Natural Capital: Focus on Prince Edward Island*; University of Prince Edward Island: Charlottetown, PE, Canada, 2011.
58. Ranger, N.; Hallegatte, S.; Bhattacharya, S.; Bachu, M.; Priya, S.; Dhore, K.; Rafique, F.; Mathur, P.; Naville, N.; Henriët, F. An assessment of the potential impact of climate change on flood risk in Mumbai. *Clim. Chang.* **2011**, *104*, 139–167. [CrossRef]
59. Hoogendoorn, G.; Fitchett, J.M. Tourism and climate change: A review of threats and adaptation strategies for Africa. *Curr. Issues Tour.* **2018**, *21*, 742–759. [CrossRef]
60. Wilby, R.L.; Keenan, R. Adapting to flood risk under climate change. *Prog. Phys. Geogr.* **2012**, *36*, 348–378. [CrossRef]
61. Olorunfemi, F. Managing flood disasters under a changing climate: Lessons from Nigeria and South Africa. In *NISER Research Seminar Series*; NISER: Ibadan, Nigeria, 2011; pp. 1–44.
62. Hegger, D.L.; Driessen, P.P.; Wiering, M.; Van Rijswijk, H.F.; Kundzewicz, Z.W.; Matczak, P.; Crabbé, A.; Raadgever, G.T.; Bakker, M.H.; Priest, S.J. Toward more flood resilience: Is a diversification of flood risk management strategies the way forward? *Ecol. Soc.* **2016**, *21*. [CrossRef]
63. Adamson, M.; O’Sullivan, J.; Bedri, Z. Reflecting Societal Values in Designing Flood Risk Management Strategies. In Proceedings of the E3S Web of Conferences. p. 20013. Available online: <https://www.e3s-conferences.org/> (accessed on 26 January 2023).
64. Park, K.-S.; Reisinger, Y. The influence of natural disasters on travel risk perception. *Tour. Anal.* **2008**, *13*, 615–627. [CrossRef]
65. MacDonald, E. *If You’re Stronghearted: Prince Edward Island in the Twentieth Century*; Prince Edward Island Museum and Heritage Foundation: Charlottetown, PE, Canada, 2000.
66. MacDonald, H. *I is for Island: A Prince Edward Island Alphabet*; Sleeping Bear Press: Charlottetown, PE, Canada, 2012.
67. Baldacchino, G. A taste of small-island success: A case from Prince Edward island. *J. Small Bus. Manag.* **2002**, *40*, 254–259. [CrossRef]
68. Squire, S.J. Literary tourism and sustainable tourism: Promoting ‘Anne of Green Gables’ in Prince Edward Island. *J. Sustain. Tour.* **1996**, *4*, 119–134. [CrossRef]
69. Manning, E.W.; Dougherty, T.D. Planning sustainable tourism destinations. *Tour. Recreat. Res.* **2000**, *25*, 3–14. [CrossRef]
70. Sindico, F. *Building Back Better: COVID 19 and Island Economies*; Islands Economic Cooperation Forum: Charlottetown, PE, Canada, 2021.
71. Mabee, W. A Strategy for Implementing Electric Vehicle Charging in PEI; Prince Edward Island, Canada. 2017. Available online: <http://hdl.handle.net/10315/39301> (accessed on 26 January 2023).

72. Reid, M.L. *The Statesman's Year-Book 1994-95*; Springer: Berlin, Germany, 2016; p. 312.
73. McRae, M.J. *Manufacturing Paradise: Tourism, Development and Mythmaking on Prince Edward Island 1939–1973*; Carleton University: Ottawa, ON, Canada, 2004.
74. Houston, C.; Gyamfi, S.; Whale, J. Evaluation of energy efficiency and renewable energy generation opportunities for small scale dairy farms: A case study in Prince Edward Island, Canada. *Renew. Energy* **2014**, *67*, 20–29. [[CrossRef](#)]
75. Kahri, S.P. *Environmental Attitudes of Golf Tourists and Their Willingness to Pay a Premium: Towards a More Sustainable Future of Golf*; Leiria, Portugal. 2021. Available online: <http://hdl.handle.net/10400.8/5874> (accessed on 26 January 2023).
76. Razi, F.; Dincer, I. A review of the current state, challenges, opportunities and future directions for implementation of sustainable electric vehicle infrastructure in Canada. *J. Energy Storage* **2022**, *56*, 106048. [[CrossRef](#)]
77. Scott, D. Why sustainable tourism must address climate change. *J. Sustain. Tour.* **2011**, *19*, 17–34. [[CrossRef](#)]
78. Weaver, D. Can sustainable tourism survive climate change? *J. Sustain. Tour.* **2011**, *19*, 5–15. [[CrossRef](#)]
79. Kielly, E.R. *Resilience and Capacity in Small Island Jurisdictions: A Case Study of Adaptation for Climate Change on Prince Edward Island*; University of Prince Edward Island: Charlottetown, PE, Canada, 2012.
80. Langlois, P.; Gauthier, G. Prince Edward Island. In *Canadian Energy Efficiency Outlook*; River Publishers: New York, NY, USA, 2020; pp. 173–182.
81. McCaffrey, K.M. *Conservation of Coastal Sand Dune Systems: Social Perceptions of Prince Edward Island National Park Sand Dune Restoration Efforts*; University of Akureyri: Isafjordur, Iceland, 2017.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.