ASSESSING RECREATIONAL USE VALUE IN BRITISH COLUMBIA'S LARGEST URBAN PARK

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ABSTRACT

Urban parks play a vital role in improving daily life for residents and providing a range of ecological benefits. This study applies the Travel Cost Method to estimate the recreational use value of Kenna Cartwright Park, the largest municipal park in British Columbia, located in Kamloops. Based on survey and visitation data, the estimated consumer surplus per person per visit is CAD 19.23, resulting in an annual recreational use value of approximately CAD 4.19 million in 2021. The study also examines how recreational value responded to external shocks, such as the COVID-19 pandemic. In spring 2020, park visitation nearly doubled during the local lockdown, and the total annual recreational value rose to CAD 6.79 million. These findings highlight the value of accessible green spaces and the essential role of urban parks in supporting public well-being and resilience in times of disruption such as COVID-19.

Keywords: consumer surplus, green infrastructure, outdoor recreation, revealed preferences, travel cost method, welfare economics

INTRODUCTION

Urban parks, as semi-natural ecosystems, offer a wealth of health, ecological, environmental, social and economic benefits (Kolimenakis et al., 2021; Wilson & Xiao, 2023; Zhang & Qian, 2024). However, these green spaces also present a trade-off, occupying land that could otherwise accommodate buildings and roads to support growing urban populations (Du & Zhang, 2020; Huang et al., 2023; Kabisch et al., 2016; Reeve, 2024). Assessing the economic value of ecosystem services of urban parks informs policymakers about development, maintenance and preservation priorities.

A park's total value offers a broad estimate of its worth, but recreational use value provides detailed insights into how these green spaces function as leisure, sport hubs and during crises such as during the COVID-19 pandemic (Grzyb et al., 2021; Venter et al., 2020). This specificity is critical for informed decision-making and resource allocation. In this study, we estimate the recreational use value of Kenna Cartwright Park (KCP), the largest municipal park in British Columbia, Canada.

KCP is an 800-hectare municipal nature park located in the Southwest of Kamloops, a city of 100,000 people in the interior of British Columbia. The park includes over 40 kilometres of trails for various skill levels, making it a popular site for recreational activity. Ecologically, the park is diverse, with wetlands, hills, valleys, grasslands, sagebrush, Ponderosa Pine and Douglas Fir forests. It overlooks Kamloops, the confluence of the North and South Thompson Rivers and Kamloops Lake. KCP also supports a range of wildlife including insects, diverse bird species, chipmunks, Coyotes, deer and Black Bears. The park serves as a model of urban blue-green infrastructure, integrating ecological conservation with recreational use (City of Kamloops, 2021; Truscott & Tsigaris, 2022).

Despite KCP's appeal, its recreational use value has not been comprehensively studied. This omission leaves a gap in understanding its economic significance and role in urban life in British Columbia. KCP thus presents an important case study for assessing recreational value and for informing urban park policy in the region.

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Kenna Cartwright Park, looking west. © Panagiotis Tsigaris

In addition to its ecological and recreational value, KCP is a municipally designated protected area governed by long-term conservation and land-use objectives (Kamloops Museum and Archives, n.d.; Mt. Dufferin Land Use Plan, 1996). This designation supports the park's ecological integrity while maintaining public access. Such governance structures differentiate KCP from undesignated areas that may lack coordinated protection and are more vulnerable to land-use pressures. Protected areas like KCP also attract dedicated public investment and policy attention, making them especially suitable for welfare-based valuation. Measuring the recreational value of parks like KCP can help inform decisions about urban planning, conservation, and how public funds are allocated.

This study uses the Travel Cost Method (TCM) to estimate KCP's recreational value. Originally proposed by Hotelling in 1947 and refined by Clawson and Knetsch (1966), TCM assumes that the benefit of a recreational site visit is reflected in the cost incurred by visitors. These costs include travel expenses, such as fuel and parking, and the opportunity cost of time. By combining this with the frequency of visits, the method estimates the site's recreational value. TCM was selected because it provides a widely accepted and robust framework for valuing recreational benefits. However, TCM only captures the use value of the recreational site, as it excludes the non-use and option values, which may lead to an underestimation of the total value of ecosystem services provided by parks.

Importantly, this study's valuation approach, TCM, falls within the domain of welfare economics and estimates consumer surplus as a measure of direct recreational benefit. This contrasts with frameworks like the System of Environmental-Economic Accounting (SEEA) or the System of National Accounts (SNA), which focus on exchange values and market transactions (United Nations et al., 2014). As this research is designed to measure welfare-based recreational value rather than exchange values tied to GDP, it does not use SEEA or SNA approaches. This distinction is critical to correctly interpret the findings.

Data for this study were collected through a survey that captured variables such as visit frequency, parking availability, distance travelled, transport mode, conservation motivations and socio-demographic background. The survey was distributed via 600 leaflets containing a QR code and a cover letter: 200 were handed out at park entrances and 400 placed in residential mailboxes. The response rate was 24.3 per cent, yielding 146 responses, most of which came from the on-site distribution.

METHODOLOGY

The Travel Cost Method and refinements

TCM assumes a correlation exists between the benefits of a recreational site and the associated visitation cost. The method estimates the Marshallian consumer surplus by using the total cost per visit and the frequency of visits as inputs controlling for all other socio-economic, demographic and attitudinal confounding factors


Kenna Cartwright Park, overlooking the City of Kamloops and the confluence of the North and South Thompson Rivers. © Arwinddeep Kaur

(Bateman, 1993). Travel costs included in TCM are unavoidable expenses such as fuel, parking and tickets, as well as the opportunity cost of travel time. Researchers typically estimate these costs from surveys and market prices. Recent refinements, such as point-to-point mapping to estimate travel time and cost, have improved its accuracy by mitigating traditional bias (Hanauer & Reid, 2017). The method used to estimate the demand for recreational services is the zero-truncated negative binomial (ZTNB) regression, which addresses the zero truncation in our on-site travel cost data, where individuals with zero visits are not observed (Martínez-Espiñeira & Amoako-Tuffour, 2008). This method adjusts for the fact that the dependent variable (number of visits) cannot be zero by design. We also compute 95 per cent confidence intervals for the consumer surplus using the delta method, which improves the statistical robustness of the welfare estimates (Hole, 2007).

Welfare economics and exchange-based accounting approaches

This study adopts a welfare economics approach to estimate the recreational value of Kenna Cartwright Park using the Travel Cost Method (TCM), a revealed preference technique that measures consumer surplus, the difference between what visitors are willing to pay and what they actually spend to visit the park. For instance, if someone spends CAD 10 but would have paid up to CAD 30, the surplus is CAD 20. Aggregated across all visitors, this surplus reflects the park's total recreational benefit, even though entry is free.

Unlike accounting-based approaches such as the System of Environmental-Economic Accounting (SEEA, United Nations et al., 2014), which value ecosystem services using market prices or replacement costs, TCM captures non-market values tied to personal well-being and user satisfaction. SEEA attempts to measure environmental stocks, such as biomes and their alterations, including coastal systems, open sea, forests, wetlands, rivers and lakes, and grasslands, as well as ecosystem service flows such as carbon sequestration, and uses market prices, replacement costs, or avoided damage costs. In contrast, our approach estimates non-market values that capture personal well-being and user satisfaction, which are not directly observable in economic transactions. For example, while SEEA might count the CAD 10 spent or estimate avoided healthcare costs, TCM focuses on the CAD 20 in perceived benefit, providing a different but complementary perspective. These are both valid perspectives, but they answer different questions: TCM asks how much value people receive, and SEEA asks how much value flows through the economy. The values reported here are not market transactions or revenues, but indicators of the well-being generated by access to green space. These estimates are especially relevant for urban planning and public health. In line with best practice, we also identify the beneficiaries, local residents, to inform policies that support equitable access to nature in urban settings.

Applying the Travel Cost Method in Kenna Cartwright Park

This study applies TCM to estimate the use value of KCP. We focus on determining the consumer surplus per person per visit while capturing the park's significance for residents and their willingness to pay for its preservation. To model the frequency of visits, we use a count regression model, specifically the zero-truncated negative binomial count (ZTNB) regression, which is suitable for this type of zero truncated and over-dispersed data (Cameron & Trivedi, 2013; Englin & Shonkwiler, 1995; Oh & Choi, 2020). We specify the expected demand curve for visiting KCP in the form of an exponential function.

$$AV_i = e^{(\beta_0 + \beta_{TCost} TCost_i + \beta_1 HsSize_i + \beta_2 WalkBike_i * SingleTravel_i + \beta_3 (HighInc_i * AgeGroup_i) + \beta_4 Ho_i)} \quad (1)$$

In this regression equation, AV refers to the average number of visits an individual makes. The variable TCost captures the unavoidable travel cost incurred by an individual, which is measured in Canadian dollars (CAD) and includes all expenditures associated with travel, such as fuel,= and the opportunity cost of travel time. Most studies value the opportunity cost of travel time at one-third of the estimated hourly wage. We approximated the hourly wage by dividing self-reported household income by an assumed 2,000 working hours per year, following standard practice in the travel cost literature (Freeman, 2014). HsSize denotes the household size reported by the respondent, which includes adults and children living in the same household. The WalkBike variable is a binary indicator denoting the mode of transportation used by the respondents. A value of 1 indicates that respondents travelled by walking, running, biking or using an e-bike to reach the site, while 0 signifies other means of transportation. The variable SingleTravel signifies the size of the visitor's group, with a value of 1 indicating a solitary visitor (group size of 1) and zero if the visitor was part of a group (group size of more than one). We include the interaction term WalkBike * SingleTravel in the model to differentiate between the visitation behaviours of different groups. Specifically, this term allows the model to distinguish the frequency of visits for those who walk or bike to the park and travel alone (i.e. WalkBike = 1 and SingleTravel = 1) from those who use other modes of transportation or travel in groups. Without this interaction term, the model would suggest that the impact of travelling alone on the visitation rate is consistent across all transportation methods. However, the frequency of visits may differ based on the transportation method and group size. The variable HighInc is a binary variable denoting the income group of the respondent. It is assigned the value of 1 if the respondent reported an income between CAD 100,000 and 150,000 and 0 otherwise. AgeGroup is an age group indicator variable. It is 1 if the respondent falls into the age group of 45 to 54 years and 0 for respondents in other age groups. The interaction term HighInc * AgeGroup captures the possible effects of being in a high-income category on the visitation rate for individuals, specifically within the 45–54 age group. Essentially, it allows us to examine whether the influence of higher income on park visit frequency differs for people in the 45–54 age bracket compared to those in other age groups. This approach allows us to test whether higher income affects park visit frequency differently for individuals aged 45–54 compared to other age groups. For example, people in this age and income group might have more leisure time or a stronger preference for outdoor activities, which could lead them to visit the park more often than others. Ho represents home ownership. If the respondent is a homeowner, this variable equals 1, and 0 if the respondent is a renter. We can calculate the Consumer Surplus (CS) per visit by using the following formula as suggested by Hellerstein and Mendelsohn (1993) and Englin and Shonkwiler (1995):

$$CS/AV = -1/\beta_{TCost} \quad (2)$$

For a detailed derivation of this formula, please refer to Appendix 1 (Supplementary Online Material).

SURVEY DESIGN, ADMINISTRATION AND DATA MANAGEMENT

Survey structure

The survey instrument (Supplementary Online Material) has three sections and attempts to capture the factors that influence the visitors' visitation rates and experience at KCP. The first segment of the survey addresses questions about parking amenities and the frequency of visits annually and during the four seasons. Figure 1 illustrates the distribution of these reported visits by season, highlighting an increase starting in spring, peaking in summer and fall, and declining significantly in winter due to cold weather and snow cover. This section also seeks to understand visitors' general views on urban encroachment of green space, significant alterations within the park area, and their satisfaction with the existing park amenities. The second segment aims to capture the visitors' revealed preferences. It incorporates questions about the travel distance, travel time, and the transportation the visitors use to get to the park. This part aims to estimate the travel cost of the visitors. The final section collects socio-demographic information about the respondents to control for socio-demographic factors which might affect park usage and attitudes toward park preservation.

Survey distribution and collection

The survey distribution plays an important role in ensuring a representative sample of the population of local residents that visit the park. To maximise the response rate, a two-pronged approach was adopted for survey distribution. An in-person distribution occurred during the initial three weeks of September 2022. Printed leaflets containing the online survey's QR code along with a cover letter were handed out at the entrance points of KCP and its parking lots. Mailbox distribution was also implemented, acknowledging that KCP is

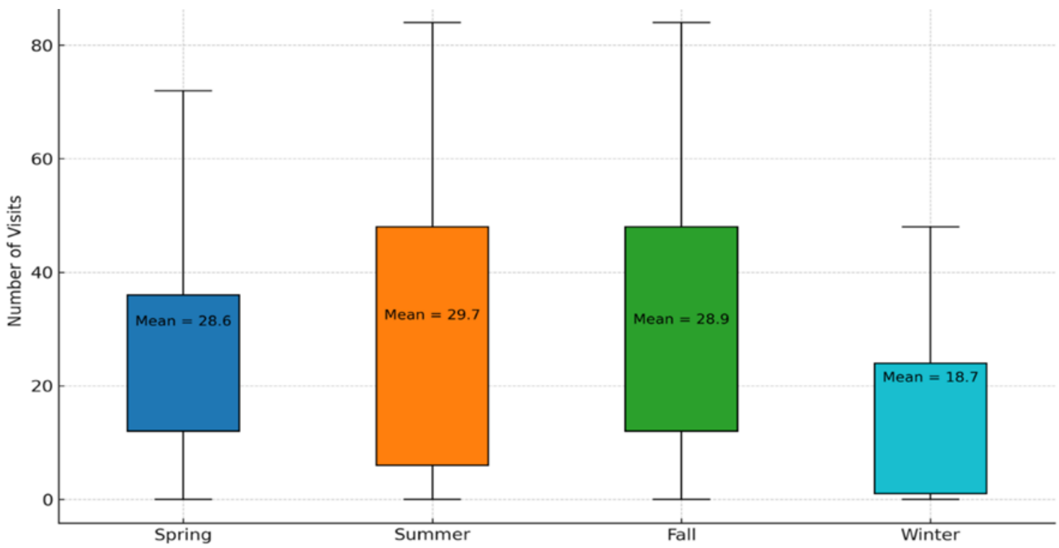

Figure 1. Distribution of park visits by season

surrounded by the Mt. Dufferin neighbourhood with various hidden trails preferred by local residents. Over the following two weeks, leaflets were distributed into neighbourhood mailboxes to reach those residents who might access the park via lesser-known entrances or trails.

Over the course of this exercise, 600 leaflets were distributed, 200 handed out in person and 400 delivered via neighbourhood mailboxes. Most responses came from in-person distribution, while relatively few resulted from mailbox delivery, leading to a response distribution skewed towards in-person interaction. This approach helped mitigate potential proximity bias associated with residents living near the park. It also improved the accuracy of travel cost data, which typically benefits from on-site collection. Notably, lower responses from the mailbox distribution could be due to residents perceiving the survey leaflets as advertisements.

RESULTS

The survey was live from 1 September to 15 October 2022, during which 146 responses were received, resulting in a response rate of 24.33 per cent. To ensure the study accurately reflected the value of the local park to Kamloops residents, responses from tourists were removed. These were identified as respondents reporting one-way travel distances of more than 30 kilometres. In addition, to enhance the accuracy of travel cost data, self-reported travel times and distances were compared with the fastest travel times and minimum distances from the respondents' postal codes according to Google Maps. Table 1 summarises the key variables used in the study,

Table 1. Summary statistics

Variable	Description	Mean	StDev	Obs
AV	Average number of visits made by an individual	103.88[1]	94.72	144
TCost	Unavoidable cost of travel and opportunity cost of travel time (CAD)	6.12	8.07	133
HsSize	Respondent's reported size of household (Adults+Children)	2.59	1.15	146
WalkBike	Respondents who reported walk/run/bike/Ebike = 1, other means = 0	0.46	0.50	146
SingleTravel	Group size of 1 = 1, group size more than 1 = 0	0.33	0.47	146
HighInc	Reported income between CAD 100,000–150,000, HighInc = 1	0.25	0.43	146
AgeGroup	Age group of 45 to 54 years = 1, other groups = 0	0.21	0.41	146
Ho	Homeowners = 1, renters = 0	0.72	0.44	144

1 An annual average of 103.88 visits may appear high but is reasonable given the park's urban location and its role in residents' daily routines.

Table 2. Zero-truncated negative binomial regression results

	Annual	Spring	Summer	Fall	Winter
TCost	-0.052***	-0.048***	-0.051***	-0.068***	-0.045*
	(0.013)	(0.013)	(0.016)	(0.014)	(0.026)
HsSize	-0.088	-0.122*	-0.072	-0.041	-0.242*
	(0.064)	(0.066)	(0.075)	(0.074)	(0.127)
WalkBike* SingleTravel	0.144	0.061	0.199	-0.073	0.662**
	(0.162)	(0.159)	(0.190)	(0.176)	(0.339)
HighInc* AgeGroup	0.844***	0.766***	0.849**	0.818***	0.855***
	(0.185)	(0.167)	(0.282)	(0.195)	(0.312)
Ho	0.632***	0.613***	0.552**	0.734***	1.216***
	(0.165)	(0.176)	(0.231)	(0.206)	(0.333)
Constant	4.485***	3.325***	3.190***	3.202***	2.036***
	(0.236)	(0.232)	(0.274)	(0.259)	(0.490)

Note: *** p<0.01, **p<0.05, *p<0.1. 95% robust standard errors in parentheses

providing a description and the mean value, standard deviation and number of observations for each.

Regression results

As the assumption of equal mean and variance required for Poisson regression is not satisfied in our data, and individuals with zero visits not being observed, we applied a zero-truncated negative binomial (ZTNB) model instead. This approach is appropriate for two reasons. First, the count data on park visitation are over-dispersed, with the variance exceeding the mean, making the negative binomial distribution more appropriate than the Poisson. Second, and more importantly, our survey captures only individuals who have visited the park, meaning that the dependent variable does not contain any zero values. In such cases, using a standard count model would produce biased estimates, as it assumes that zero outcomes were possible but not observed. The ZTNB model explicitly accounts for this ‘truncation at zero’, adjusting the likelihood function to reflect that the sample is drawn only from positive counts. This model allowed us to produce consistent estimates of the determinants of visitation. Table 2 presents annual and seasonal visit frequency results using the ZTNB specification.

It is important to note that because our sample includes only individuals who visited the park, the estimation is subject to endogenous stratification, a common issue in travel cost studies where observed users self-select into the sample. As a result, the estimated recreational values reflect conditional use values, which benefit actual park visitors rather than the general population. The literature widely accepts this approach and aligns with previous applications of truncated count models (Englin & Shonkwiler, 1995; Martínez-Espiñeira & Amoako-Tuffour, 2008).

The ZTNB regression results reveal several findings contributing to our understanding of urban park usage. Firstly, travel cost (TCost) shows a statistically significant negative relationship with visitation frequency across all seasons. As expected, the higher the travel cost, the less frequently individuals visit the park, suggesting that travel distance, time, or associated expenses deter recreational use. Household size (HsSize) shows a negative association but mostly insignificant relationship with park visits. The interaction term WalkBike * SingleTravel is positive in most models but not statistically significant, except in the winter model, where it reaches significance at p<0.05. This result suggests limited evidence that solo visitors using non-motorised transportation systematically visit the park more often than others. However, the significant effect observed in winter may point to a specific behavioural pattern, where individuals who walk or bike alone continue to engage with the park despite colder conditions. Although this finding warrants cautious interpretation, it may indicate that maintaining safe, accessible infrastructure for active transportation supports year-round usage. The

Kenna Cartwright Park, View of Kamloops Lake. © Panagiotis Tsigaris

Table 3. Estimated consumer surplus per person per visit

Variable	Annual	Spring	Summer	Fall	Winter
Consumer surplus (CAD $)	19.23	20.83	19.61	14.71	22.22
95% CI lower bound	9.81	9.77	7.55	8.77	-2.94
95% CI upper bound	28.65	31.89	31.66	20.64	47.39

Note: The consumer surplus per person per visit was calculated as the negative inverse of the coefficient for the variable *TCost* from the regression model. The 95% confidence intervals were derived using the delta method, based on the standard errors of the estimated coefficients. The delta method provides an approximate variance for nonlinear transformations of model parameters and is widely used in travel cost method (TCM) applications. Negative lower bounds, such as in the winter model, indicate high uncertainty and should be interpreted with caution rather than as negative welfare.

interaction term of HighInc * AgeGroup is significantly associated with a higher frequency of park visits across all seasons. This finding implies that individuals in the 45–54 age group with high incomes are more likely to visit the park more frequently. These findings align with previous studies (Ma et al., 2022; Reed et al., 2012; Sreetheran, 2017) that highlight how this age group uses urban parks more for physical activity than any other age group. Lastly, homeownership (Ho), which could serve as a proxy for wealth or income, is significantly and positively associated with the frequency of park visits across all seasons.

Assessing the recreational value of Kenna Cartwright Park[1]

Table 3 reports the estimated consumer surplus per person per visit for Kenna Cartwright Park, calculated as the negative inverse of the travel cost coefficient in each regression model. Confidence intervals are derived using the delta method, which accounts for the nonlinear transformation of the coefficient estimates. The seasonal estimates range from approximately CAD 14.71 in fall to CAD 20.83 in spring. The summer and annual models

1 All monetary values presented are non-market welfare estimates based on consumer surplus, and should not be interpreted as GDP, gross value added, or other market-based indicators.

Table 4. Recreational use value of the park and seasonal visits

	Recreational use value (in millions of CAD $)		
Year	**2019**	**2020**	**2021**
Spring	1.51	2.94	1.38
	(0.71-2.31)	(1.38-4.51)	(0.65-2.11)
Summer	1.48	1.63	0.83
	(0.57-2.39)	(0.63-2.64)	(0.32-1.35)
Fall	0.77	0.10	0.66
	(0.46-1.08)	(0.06-0.14)	(0.39-0.92)
Winter	1.03	1.33	1.43
	(-0.14-2.20)	(-0.18-2.85)	(-0.19-3.06)
Annual	4.75	6.79	4.19
	(2.42-7.08)	(3.47-10.12)	(2.14-6.25)
	Number of visits		
Year	**2019**	**2020**	**2021**
Spring	72,525	141,344	66,060
Summer	75,631	83,303	42,545
Fall	52,446	68,410	44,803
Winter	46,441	60,159	64,604
Total visits	247,043	353,216	218,012

Note: The visits data were provided by the Parks and Civic Facilities Department of the City of Kamloops. The recreational use value of the park was calculated by multiplying the estimated consumer surplus per person per visit by the total number of visits for each season. The values in brackets represent the 95% confidence interval

yield similar surplus values of CAD 19.61 and CAD 19.23, respectively. The winter estimate is slightly higher at CAD 22.22 but is not statistically significant at the p<.05 level as indicated by the wider confidence interval. These findings indicate that recreational value varies across seasons, with spring and summer providing relatively higher per-visit benefits, likely due to more favourable weather.

The recreational value of Kenna Cartwright Park and COVID-19

Table 4 highlights how the recreational value of Kenna Cartwright Park shifted during the COVID-19 pandemic, reflecting changing recreational preferences. In 2020, the year of the pandemic with public health restrictions, spring saw a dramatic increase in use value, rising to nearly CAD 2.94 million, double the 2019 and 2021 levels. This increase coincided with the initial lockdown period, when gyms, community centres and indoor venues were closed under provincial health orders (Government of British Columbia, 2020), and residents turned to outdoor spaces for physical activity, stress relief and safer social interaction (City of Kamloops, 2020; Geng et al., 2021; Honey-Rosés et al., 2020). Overall annual visits increased by more than 100,000, peaking at over 353,000 in 2020. Overall, the park's annual recreational use value reached CAD 4.75 million in 2019, increased to CAD 6.79 million in 2020, and declined to CAD 4.19 million in 2021.

Seasonal variation also changed in 2020. While spring use values rose in 2020, the summer, fall and winter visitations rates dropped sharply, likely due to softening of the public health restrictions and alternative leisure options resumed. In 2021, as pandemic restrictions eased further, both total visits and recreational value declined relative to the COVID-19 2020 year, except for the winter season. Urban green spaces played an important role during the pandemic (Venter et al., 2020). They were the essential public infrastructure for health and well-being (Hazlehurst et al., 2022). With an estimated recreational use value peaking at CAD 6.79 million in 2020, the data make a strong case for maintaining and expanding accessible parkland.

As cities plan for future resilience, whether in response to pandemics, climate change or urban densification, investments in parks should be viewed not just as aesthetic or recreational amenities, but as foundational components of public health and social infrastructure.

It is worth mentioning here that while our estimation focuses on visitors who used the park, it is important to acknowledge the potential for endogenous stratification due to on-site sampling. Since our data does not observe individuals with zero visits, the sample is conditional on participation. However, this does not bias the welfare estimates derived from the travel cost method, as our objective is to evaluate the recreational use value conditional on visitation. This approach features prominently in empirical applications of on-site travel cost models (e.g. Martínez-Espiñeira & Amoako-Tuffour, 2008).

DISCUSSION

Our findings show that Kenna Cartwright Park offers significant recreational value, with observable seasonal patterns and a noticeable increase in use during the COVID-19 pandemic. In 2020, total visits increased by over 100,000 compared to 2019 and 2021, and the park's annual recreational value peaked at CAD 6.79 million. This highlights the park's vital role during public health emergencies, when indoor venues were closed and residents turned to outdoor spaces for physical and mental well-being.

Applying a welfare economics framework and the Travel Cost Method, we estimate a total recreational use value of approximately CAD 4.19 million in 2021, with a peak of CAD 6.79 million in 2020. While this study focuses specifically on use value derived through a revealed preference approach, other studies have assessed the broader ecosystem service value of Kenna Cartwright Park using different methods. For example, Truscott and Tsigaris (2022) employed a land value-based approach to estimate the park's total ecosystem services. Though the methodologies and objectives differ, these studies collectively reflect the multifaceted importance of protected urban green spaces.

Although not the primary focus of this study, it is worth noting that survey responses also revealed park users' concerns about development and environmental pressures, particularly the perceived threat of urban encroachment on Kenna Cartwright Park. Respondents expressed a strong desire to preserve the park's natural character, with greater concern voiced over future housing developments than over existing infrastructure projects such as the Trans Mountain Pipeline Expansion (Davies, 2020; Trans Mountain, 2020). These concerns are timely, as recent development proposals (Reeve, 2024) and ongoing urban growth illustrate the increasing tension between green space preservation and competing land uses. While outside the scope of the travel cost analysis, these perceptions highlight the need for integrated urban planning that protects natural areas from incremental encroachment and aligns with residents' clearly expressed values.

Beyond its role in estimating current recreational benefits, the welfare-based valuation approach used in this study offers strong potential for long-term application in park management. If repeated periodically, such valuations can track changes in use patterns, perceived value, or the effects of new infrastructure and policy decisions. This provides park authorities with a practical tool for evaluating how well their programmes support community well-being and equitable access to nature.

This study has several limitations. It includes only actual park users, excluding non-visitors and thus reflecting conditional rather than population-wide values. On-site sampling introduces endogenous stratification and may overstate average consumer surplus if visitors are systematically more motivated or able to access the park. Data were collected during a single period in early fall, which may not fully reflect seasonal variation. Self-reported travel behaviour may be subject to recall bias. The model also assumes homogenous preferences and does not account for substitute sites, which could affect estimated values.

Future studies could explore the park's impact on physical and mental health, estimate non-use values, and assess how further alterations may influence recreational behaviour. Such extensions would further inform policies aimed at optimising urban green spaces to enhance quality of life. Importantly, valuing parks through a welfare-based lens helps capture personal benefits, like enjoyment and satisfaction, that don't show up in market prices, making this approach a useful complement to traditional ecological or accounting-based assessments.

SUPPLEMENTARY ONLINE MATERIAL

Appendix 1. Derivation of the consumer surplus formula
Survey instrument

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Sagebrush and pine habitat in Kenna Cartwright Park, looking northeast. © Panagiotis Tsigaris

books with students, and mentored undergraduate and graduate research on sustainability, climate economics, and real-world public policy challenges.

Data Availability Statement: In line with the commitment to support replicable and transparent research, the survey, the derivation of consumer surplus in an appendix, and all data in excel supporting the findings of this study are available on the Open Science Framework (OSF). The datasets were fully anonymized to ensure privacy and ethical compliance. The primary dataset used for empirical analysis can be accessed directly via the following OSF link: http://doi.org/10.17605/OSF.IO/5MWBN

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RESUMEN

Los parques urbanos desempeñan un papel fundamental en la mejora de la vida cotidiana de los residentes y proporcionan una serie de beneficios ecológicos. Este estudio aplica el método del coste del viaje para estimar el valor recreativo del parque Kenna Cartwright, el mayor parque municipal de Columbia Británica, situado en Kamloops. Según los datos de la encuesta y las visitas, el excedente del consumidor estimado por persona y visita es de 19,23 dólares canadienses, lo que supone un valor recreativo anual de aproximadamente 4,19 millones de dólares canadienses en 2021. El estudio también examina cómo el valor recreativo respondió a perturbaciones externas, como la pandemia de COVID-19. En la primavera de 2020, las visitas al parque casi se duplicaron durante el confinamiento local, y el valor recreativo anual total ascendió a 6,79 millones de dólares canadienses. Estos resultados ponen de relieve el valor de los espacios verdes accesibles y el papel esencial de los parques urbanos para apoyar el bienestar público y la resiliencia en tiempos de perturbaciones como la COVID-19.

RÉSUMÉ

Les parcs urbains jouent un rôle essentiel dans l'amélioration de la vie quotidienne des habitants et offrent toute une série d'avantages écologiques. Cette étude applique la méthode du coût du déplacement pour estimer la valeur récréative du parc Kenna Cartwright, le plus grand parc municipal de Colombie-Britannique, situé à Kamloops. Sur la base d'une enquête et de données sur la fréquentation, le surplus du consommateur estimé par personne et par visite est de 19,23 dollars canadiens, ce qui représente une valeur récréative annuelle d'environ 4,19 millions de dollars canadiens en 2021. L'étude examine également comment la valeur récréative a réagi à des chocs externes, tels que la pandémie de COVID-19. Au printemps 2020, la fréquentation du parc a presque doublé pendant le confinement local, et la valeur récréative annuelle totale est passée à 6,79 millions de dollars canadiens. Ces résultats soulignent la valeur des espaces verts accessibles et le rôle essentiel des parcs urbains dans le soutien du bien-être et de la résilience de la population en période de perturbation telle que la COVID-19.