A Study of the Value of Kamloops Parks

PETER TSIGARIS; ABUBAKAR, LEILA; AJANI, AYOOLA O.; BHARDWAJ, SAARANSH; IBEKWE, ADAKU; KAUR, ARWINDDEEP; RAHMAN, SHEIKH FARZIN; SHEMO, UMMA; TAGHIYEV, RASHAD; JAKE TRUSCOTT; AND WAITHE, DAVID

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Forward by Professor Paul Sutton

It is my distinct pleasure to write a preface to work of Peter Tsigaris, Leila Abubakar, Ayoola Ajani, Saaransh Bhardwaj, Adaku Ibekwe, Arwinddeep Kaur, Sheikh Farzin Rahman, Umma Shemo, Rashad Taghiyev, and David Waithe summarized in the study of the value of Kamloops parks. This work advances our understanding of the value of urban ecosystems through a spatially explicit assessment of many parks in the city of Kamloops, Canada. These assessments of value are eye-opening and the per capita value of these parks as natural capital is quite interesting. Raising public awareness of the idea that each citizen has a 'stake' of almost $30,000 of natural capital in the Kenna Cartwright Nature Park will likely change the way people think about the value of nature and hopefully the importance of nature to their health and wellbeing. The study of the value of green spaces in the urban environment is challenging fundamental assumptions about urban planning, economic theory, and economic growth.

The Global Financial Crisis (GFC) of 2008-9 opened many people's eyes to the failures and limitations of economists and economic theory. Both orthodox economists (e.g. Paul Krugman and Joseph Stiglitz) and heterodox economists (e.g. John Komlos and Herman Daly) have written of a discipline (Economics) in crisis. The GFC was perhaps a tipping point in

awareness of this crisis although many have made valid and significant criticism of the neo-liberal theoretical framework for decades.

Disciplines have crises and most evolve in a positive way as a result of these crises. In astronomy, the Copernican revolution that placed the sun at the center of the universe rather than the earth was a challenge to world views that changed the way we see ourselves in the cosmos. Nonetheless, Copernicus was a 'radical' astronomer. Physics has experienced revolutions as well. Einstein's relativity was a profound departure from Newtonian physics as was the development of quantum mechanics. Einstein, Schrodinger, Bohr, Dirac, and many others were 'radical' physicists. Physics and astronomy have nonetheless survived as academic disciplines despite these crises.

Economics is currently in a crisis. The impact that long-held assumptions of rational behavior, perfect information, and invisible hands have on real-world policy and practice are showing glaring problems. An apocryphal quote often attributed to Schopenhauer perhaps captures this crisis in economics: '*Truth passes through three phases. First, it is ridiculed. Second, it is violently opposed. Third, it is accepted as having always been true.*' The reality of climate change certainly seems to be proceeding through these phases.

The truths that many economists appear to be ridiculing and opposing are many and include the following:

- Increased income and wealth inequality reduces economic growth and overall productivity measured in a traditional

sense (e.g. GDP) and measured via newer non-traditional measures such as human well-being. Thomas Piketty is perhaps a 'radical' economist who has pointed this out.

- Natural capital and the annual value of ecosystem services provided by natural capital are greater than global GDP and cannot be internalized as trivial externalities.
- The identified 'market failures' of public goods, common-pool resources, and externalities are more significant than previously imagined. Climate change, ocean acidification, biodiversity loss, nitrogen fluxes, and the world's 6th great extinction represent some empirical evidence of some of these global market failures.
- GDP is a flawed measure of human well-being that has overly influenced too much public policy. See Lorenzo Fioramonte's book entitled 'Gross Domestic Problem'
- Given planetary boundaries and safe operating spaces, infinite growth in GDP and/or population is impossible.
- Key economic ideas such as the 'invisible hand' and 'market efficiency' are fairy tales with little or no empirical data to support them.

Many people trained in economics have unusually privileged positions in government with more ability to influence policy than most. Many economists espouse 'free markets' and 'less government' as solutions to problems exacerbated by free markets and less government. Perhaps many of these economists are having difficulty engaging in this dialog because it is often difficult to get a man (or woman but usually a man) to understand something when his/her worldview and privileged position depends on him/her, not understanding.

Nonetheless, many other economists like Peter Tsigaris acknowledge these challenges to their disciplinary perspective and embrace an engagement with these challenges to contribute to the positive evolution of the discipline of economics (http://evonomics.com/). To my mind, Peter Tsigaris is a 'radical' economist who aims to contribute to the evolution of the discipline in such a way as to help us chart a path to a sustainable and desirable future. This book on radical valuing natural capital in Kamloops is such a contribution. It is in many respects informed by the ideas of the trans-discipline of ecological economics.

The very term 'Sustainable Development' combines a fundamental ecological idea of 'sustainability' with a fundamental economic idea of 'development'. This marriage of words is not an easy one because ecologists and economists have argued over fundamental pre-analytic visions regarding 'the limits to growth' for a long time. There is an optimism associated with economists juxtaposed with a pessimism from ecologists that is captured by two 'Light Bulb' jokes:

Question: How many ecologists does it take to screw in a light bulb?
Answer: Who cares? We are all doomed anyway (overpopulation, climate change, etc).

Question: How many economists does it take to screw in a light bulb?
Answer: None. The invisible hand will do it for us.

Professor Tsigaris is a traditionally trained economist who is engaging in the radical and challenging process of attempting to create a synthesis from the thesis and antithesis embodied in these two 'light bulb' jokes and in many respects embedded in the diverging world views of ecologists and economists. I wish him well in this endeavor and encourage you to also. Much human suffering can be avoided if we succeed in reaching this synthesis.

May 2022

Paul C. Sutton, Full Professor
Department of Geography and Environment,
University of Denver,
Morrison, CO, USA
Website: https://portfolio.du.edu/psutton/page/3663

Preface

This book, written jointly with my graduate students, is about the asset values of numerous Kamloops parks and the annual flow of ecosystem services they provide to the community. The book evolved from a graduate course I started teaching unexpectedly last year in the Masters of Science in Environmental Economics and Management at Thompson Rivers University, Kamloops, British Columbia. The course is entitled Valuation Methods for Cost-Benefit Analysis and builds on the Foundations of Cost-Benefit Analysis course. In this course, students explore advanced techniques to assess impacts and methods to place a value on non-market goods and services (i.e., nature). Valuation methods include benefits transfer, experimental design, contingent valuation, direct market estimation including defensive expenditures, travel cost, and shadow pricing.

Undertaking a graduate course required much preparation to find relevant, interesting, contemporary, and seminal peer-reviewed articles for my students to read, critique, and discuss. I am an accidental environmental economist, and non-market valuation of the natural environment is not my main research focus.

However, three colleagues from Thompson Rivers University and I published a research paper in 2008 exploring the factors underlying public support and willingness to pay to preserve the agricultural land reserve (ALR) in British Columbia (Androkovich et al., 2008). The ALR, established in 1973,

encompasses 4.76 million hectares. The reserve aims to preserve agricultural land for farm use and to establish and maintain family farm businesses (Land Commission Act, section 7). We distributed a contingent valuation survey to elicit peoples' preferences towards preservation across the province. After analyzing 267 surveys, we found that British Columbians place not only importance "to ensure that local food production is maintained" and "the economic importance of the British Columbia's agriculture sector," but equally important was "to protect the environment." which makes sense since most of the ALR is in northern rural areas of the province. Provincewide, people were willing to pay to maintain the land reserve, with a conservative estimate being Can$91.18 million per year. A critique of introducing Bill 24 for the ALR can be found in Tsigaris (2014).

My interest in exploring urban parks and assigning this project to my students arose when I found a fascinating article written by Sutton and Anderson (2016). Sutton and Anderson placed a value on the iconic New York Central Park and its ecosystem services. A real estate appraisal firm assessed the 341 ha park at $500 billion as an opportunity cost of the land not being developed. Sutton and Anderson assumed a 5% yield from the asset, thus providing annual ecosystem services worth $25 billion per year to the community. This valuation is very high relative to Costanza et al. (2014) because it attempts to account for the interaction of social, natural, human, and built capital in an urban park. The value is not to commodify the park but to measure a form of capital preserved for the benefit of its people and the city's lungs.

I asked my students to conduct a similar analysis by selecting a Kamloops park and writing a chapter in this book about the park's value. However, instead of consulting with a real estate appraisal firm, my students collected numerous land values adjacent to their park to assess the value of the park since the land value represents the opportunity cost of not developing the park into a residential area. They submitted many drafts to me for review before being accepted for publication in the book. This review process improves their research and the final output (Tsigaris, 2021).

I gave this assignment last year as well. One of the best papers last year was by Jake Truscott, who worked with me collaboratively to refine the method and results on the valuation of the Kenna Cartwright Nature Park, which is in the rural-urban fringe of Kamloops and is considered the largest urban park in Britsh Columbia. A snapshot of this research is described in Chapter 3 of this book and has been accepted for publication in the *Journal of Rural and Community Development*. I hope you will find the book fascinating, and it will help other municipalities assess and value their natural assets.

Dr. Panagiotis (Peter) Tsigaris, April 15th 2022

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Introduction

Urban parks are important green space environments in cities (Seto et al., 2017, Nilon et al., 2017). It is impossible to envision cities without a dedicated green space. They are the city's lungs, just like the Amazon is the Earth's lungs. Parks are green infrastructures, another form of capital, contributing to the quality of life of its residents by providing environmental, ecological, recreational, social, and psychological benefits (Tzoulas et al., 2007). Parks provide many ecological services, including air and climate regulation, habitat for genetic diversity, sports, recreation, tourism, culture, art and design, spiritual experience, and many other social benefits (Costanza et al. 2017).

Parks are local public goods providing considerable external benefits to the community (McConnell and Walls, 2005). Two properties characterize parks. They are non-rivalry, provided there is no congestion, and non-excludable (i.e., open access) to the community. Non-rival means someone's enjoyment of the green space does not diminish other people's enjoyment, while non-excludability means that it is impossible to exclude someone from enjoying the green space if they do not pay for its services. As a result, municipal governments provide, maintain, and enhance the green space of cities and towns financed through local taxes.

Even though parks are plentiful in Kamloops, urbanization will be intensifying (Vardoulakis and Kinney, 2019). According to the United Nations, 68% of the world's population will live

in an urban area by 2050, up from 55% in 2018 (Seto et al., 2012, Huang and Seto, 2019, U.N., DESA, 2018, 2019). Kamloops's population is expected to increase in the near future and although Kamloops is surrounded by a beautiful natural environment and urban parks are in abundance, the population increase will add pressure on the outskirts of the city to potentially trade off natural environments for suburban development sprawl (Nechyba and Walsh, 2004). Thus city planners are to make cities "more inclusive, safe, resilient, and sustainable" as per the United Nations sustainable development goal 11 (UN DESA 2019). Kamloops is capable of achieving this sustainable development goal, and part of this goal is to protect and maintain its green space as urban development expands.

This book is about assessing numerous large and small city of Kamloops parks in terms of their value and ecosystem services they provide but in monetary terms. Assigning a monetary value does not mean commodification but indicates scarcity and the importance of such an asset (Costanza et al., 2017, Bockarjova et al., 2020). Allows the city to measure this form of capital as it does for built capital. In fact, the value of the parks can easily exceed the value of built capital which has been recently estimated at $24 billion (KTW, 2022).

For example, the Ecosystem Services Valuation Database (ESVD) has been developed by the Foundation of Sustainable Development (2021) to provide values from numerous studies about the monetary benefits of biodiversity and ecosystems. The goal is to support nature conservation, ecosystem restoration, and sustainable land management. Currently, the

database contains over 6,700 value records from about 20% of 5,000 studies and growing. The valuations are expressed in 2020 US$ per ha per year across all biomes including urban parks and forests, ecosystem services, and from various geographic regions. The following table reports values for Urban Parks and Forests from the Global Urban Green and Blue Infrastructure biome. The average value of ecosystem services provided by urban parks and forests is estimated at approximately USD 101,000 per ha per year or CND 130,000 across 147 values. Opportunities for recreation and tourism, aesthetic information, and air quality regulations are currently the most significant contributors to ecosystem services.

Table 1: Urban Parks and Forests from ESVD

Ecosystem Services	Type	Average	Median	Values	Standard Error	95% Lower	95% Upper
Air quality regulation	Regulation	13,312	9,500	105	2,366	10,946	15,678
Climate regulation	Regulation	1,623	1,005	13	1,213	409	2,836
Regulation of water flows	Regulation	620	519	4	229	391	850
Existence, bequest values	Culture	393	408	7	162	232	555
Opportunities for recreation and tourism	Culture	60,708	38,063	10	32,885	27,824	93,593
Aesthetic information	Culture	23,547	24,365	7	15,181	8,367	38,728
Totals		100,930	74,586	147		48,169	152,240

In the book, a graduate student wrote a chapter during the

Winter 2022 semester. The chapter is about the park a student selected at the beginning of the semester for the course project. Each chapter contains an introduction, and methods section, followed by the results and ending with a discussion with concluding remarks.

Parks are in the city's center, like Riverside Park in downtown Kamloops (Chapter 5 by Umma Shemo), on an island like McArthur park (Chapter 3 by Saaransh Bhardwaj). Others are on the outskirts of the city like Albert McGowan Park (Chapter 1 by Arwinddeep Kaur), Kenna Cartwright Nature Park (Chapter 2 by Jake Truscott and Peter Tsigaris), Peterson Creek Nature Park (Chapter 7 by Leila Abubakar), Ross Hill Park (Chapter 8 by David Waithe), and Valleyview Nature Park (Chapter 10 by Sheikh Farzin Rahman). Neighborhood parks are also assessed like Westsyde Centennial Park (Chapter 9 by Ayoola Ajani), McDonald Park (Chapter 4 by Rashad Taghiyev), and Prince Charles Park (Chapter 6 by Adaku Ibekwe). Figure 1 below shows the city and most of these parks, including the Lac Du Bois Provincial Park on the city's northwest outskirts. Kenna Cartwright Nature Park is the second-largest park on the southwest outskirts of the city, followed by Peterson Creek Nature Park in the heart of Kamloops and Valleyview Nature Park in the southeast of Kamloops.

Figure 1: City of Kamloops and Parks from https://geoprodsvr.kamloops.ca/citymap/

The importance of finding the value of ecosystem services of urban parks has also been highlighted recently by Professor John Janmaat from the University of British Columbia who place a $36-38 million per year valuation on ecosystem services of the iconic 367 hectares Knox Mountain Park in Kelowna. Professor Janmaat also assessed the expansion of Sutherland Waterfront Park by 5 hectares from the closure of the Tolko mill in the north end of Kelowna. Using a similar methodology to Truscott and Tsigaris (2022) he found the ecosystem service benefits from the conversion of the closure of the mill to an expanded waterfront park ranging from $300K and $2 million per year (Janmaat, 2022).

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1. Albert McGowan Park

KAUR, ARWINDDEEP

Introduction

"Green infrastructure is an interconnected network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas; greenways, parks, and other conservation lands; working farms, ranches, and forests; and wilderness and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources, and contribute to the health and quality of life for people" (Ersoy Mirici, 2022). According to UN population demographics, 56% of the world population resides in urban areas, which is expected to become 68% by 2050. Expansion of urban areas comes at the cost of green areas, and a trade-off is involved. The area under the urban green and blue infrastructure is estimated to be 352 million hectares (Costanza et al., 2014). The main principles of green infrastructure planning are multifunctionality, connectivity, diversity, and integration (Monteiro, Ferreira & Antunes, 2020). These principles resonate well with the urban parks as they are crucial for urban residents' physical and mental health. This report highlights the economic value of the services provided by Albert McGowan Park in Kamloops, BC.

Urban parks are strategically planned semi-natural

ecosystems comprising natural and built capital, which provides the salient flow of services to enhance the social capital and nourish human well-being by reducing the impacts of urban sprawl. Parks provide cultural and recreational services, regulate the local climate, provide refugia for birds, and are essential in water regulations. In the words of Sir Dasgupta, "nature is silent" and has no say in decision-making. Dollar value is an easy way to understand the worth of the services provided by the city's natural capital and makes it as valuable as building capital, human capital, and social capital for investment decisions. Valuing the flow of services gives nature an edge in a trade-off. Estimating the value is more about conservation and enhancement than commodifying and privatization attempts.

Figure 1: Pond and wetland at Albert McGowan Park. Picture taken by Arwinddeep Kaur

Albert McGowan Park

Albert McGowan Park of Kamloops city [Tk'emlúps te Secwépemc (TteS)] is in the Thompson-Shuswap region of BC.

This 9.65 ha community park is in the heart of Upper-Sahali on the Summit Drive, sandwiched between Monteith Drive in the west and Tuxford Drive in the east. This well-planned public landscape, comprising a combination of grey, green and blue infrastructure, is a crucial provider of ecosystem services to the community. It serves as a playground and sporting event venue for children, having a water spray park, three baseball diamonds, two mini soccer fields, and a vast open green playground. Hall Rogers Community centre, well-maintained short trails, picnic benches, public washrooms, and free parking are lucrative for adults accompanying children or coming for a walk. The pristine Gambles Pond in the park is home to riparian vegetation and nearly 25 bird species (Hunt, 2022). It is a mid-way resting place for migrating Sandhill Cranes, alluring the bird watchers.

Figure 2: Albert McGowen Park from City of Kamloops Maps

Methodology

This study is based on the methodology developed by Sutton and Anderson (2016). This method uses the benefit transfer method; the opportunity cost of not having real estate development at the park is used as a proxy for the minimum value of the ecosystem services provided by the urban park. This assumption is applied to avoid errors in measurement due to the complementary nature of the services. The land value of every third house, starting from the summit drive, is utilized to obtain the mean land value per ha for the park. Data for 26 detached residential houses in the park's proximity is sourced from the BC Assessment website.

Table 1: Descriptive Statistics of 26 Residential Houses at Albert McGowan Park

Variable	Mean	StDeviation	Minimum	Maximum	Q1	Median	Q3
Land Value	$291,200	$29,327	$257,000	$370,000	$267,000	$291,000	$303,000
Building Value	$411,040	$86,467	$286,000	$583,000	$335,000	$404,000	$484,000
Year Built	1989	3.7	1983	1993	1987	1992	1992
Size in Ha	0.061	0.016	0.04	0.11	0.05	0.06	0.06
Land Value/ Ha	**$4,973,523**	**$787,970**	**$3,274,125**	**$6,967,606**	**$4,808,988**	**$4,960,116**	**$5,236,591**

Results and Discussion

The estimated land value of Albert McGowan Park is $4,973,523/Ha. The minimum market value of the parkland is nearly $47,994,497. A 5% return on this value of the natural capital will provide the ecosystem services worth $2,399,724 per year, as proposed by Sutton and Anderson (2016). ESVD database built on well-reviewed literature puts a value of $138,000/Ha/Year on the ecosystem services provided by urban parks and forests. In this regard, in a single day, our community park provides services worth $3,648. Given that the cost of operating the park in a year is just a fraction of this minimum benefit range of $1.3 – $ 2.4M, there is a huge net benefit to the city residents from the existence of this park.

Figure 3: Water spray park at Albert McGowan Park. Picture taken by Arwinddeep Kaur.

Conclusion

The population of Kamloops city grew 8.4% in 5 years from 2016 to 2021 (Statistics Canada, 2022). This increase is higher than the Official Community Plan's estimation of 6%. Optimum utilization of stretched resources could be a tightrope walk for the fast-growing city. For the transparency of the investment decisions in natural capital, knowing the benefits in monetary terms is worthwhile. Albert McGowan Park is a $48M natural capital asset of the city, delivering services of more than $1.3-2.4M in a year. The social yield of 2.7% from this park is higher than the short-term government bonds and higher than the inflow if the city decides to open it for development in the next 20-36 years. This rate of return on natural capital will increase with increasing social capital. Further studies on revealed preferences can highlight the most valued aspects of ecosystem service of local parks by city residents.

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2. Kenna Cartwright Nature Park

PETER TSIGARIS AND JAKE TRUSCOTT

Introduction

This chapter is a condensed version of a paper accepted for publication in the *Journal of Rural and Community Development* (Truscott snd Tsigaris, forthcoming). The research attempts to estimate the value people place on Kenna Cartwright Park as a form of capital that is being preserved for the social benefits it provides to the community. The purpose is to provide an initial and reasonable estimate of the value of the Kenna Cartwright Park and its ecosystem services enabling policy-makers to make better-informed decisions with regard to managing, enhancing, and protecting the park. It is important to place a value on all assets including public goods like parks. Translating the ecosystem services of the park into monetary values will show the degree of scarcity of the resource. As a result, the valuation indicates the importance of maintenance, enhancement, risk management, and biodiversity conservation. Furthermore, potential ecosystem losses affect our well-being and require compensation. The following section provides a brief description of the park, followed by methodology, then results are presented, and ends

with a short discussion and concluding remarks.

Kenna Cartwright Park

Kenna Cartwright Park is a 749 ha park located on the southwest outskirt of the rural-urban fringe of the city. It is named after a former mayor and long-time proponent of nature conservation. The park was established in 1996 (Mt. Dufferin Land Use Plan, 1996). The plan included 600 residential units in the Mt. Dufferin neighborhood area. Figure 1 exhibits a map showcasing 749 hectares in size of Mount Dufferin – Kenna Cartwright Park. It is the largest municipal park in British Columbia and the ninth-largest urban park in Canada (City of Kamloops, 2021, World Atlas, 2020).

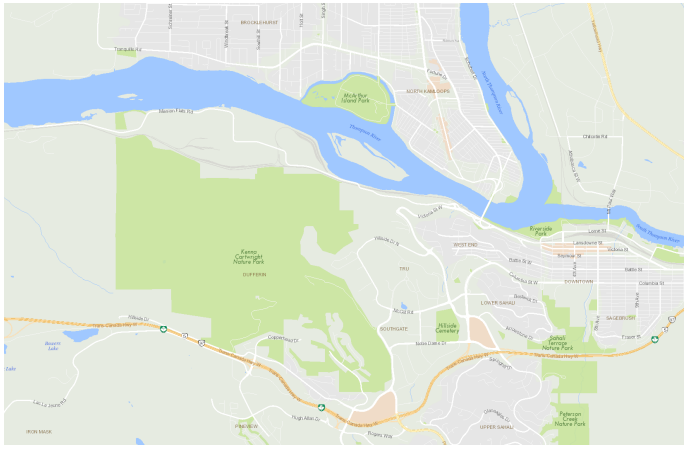

Figure 1: Kenna Cartwright Nature Park from https://geoprodsvr.kamloops.ca/citymap/

The biome contains grasslands, hills, Douglas Fir and Ponderosa Pine forests, sagebrush, wetlands, and valleys. Wildlife is abundant, including numerous birds, black bears, coyotes, chipmunks, deer, and insects. The natural setting has been modified with walkways and numerous named hiking trails to accommodate visitors to enjoy recreational and cultural services. The primary attraction is the vast 40km network of gentle nature trails leading to lookout spots, some offering a 360 – degree panoramic view of Kamloops (Figure 2). The scenic views are breathtaking at the top of Mount Dufferin or the northern part of the park overlooking Kamloops Lake.

Figure 2: Panoramic View of Kamloops Area from Kenna Cartwright Park

Methodology

In order to estimate the value of the park and the annual ecosystem services derived from Kenna Cartwright Park, a modified version of the *holistic* approach used by Sutton and Anderson (2016) is applied. Unlike Sutton and Anderson (2016),

which used an appraisal firm's estimate, the Kenna Cartwright's valuation uses land values of built capital surrounding the park as per the equivalency principle advanced by Chiabai et al, (2013). The equivalency principle is "based on the premise that the long-term value of a piece of undeveloped land ought to be at least the same as the value of an identical piece of land in the vicinity to which permission has been granted for development." As a result land values surrounding Kenna Cartwright Park were downloaded on May 5th, 2021 from the BC real estate assessment website. A total of 514 land values with single-detached homes were converted on a per hectare basis and averaged to get a unit price. This unit price was then multiplied by the 749 hectares of park size to determine the park's estimated valuation.

To find the value of the annual ecosystem services provided by urban parks a European and global value transfer function from the meta-analysis conducted by Bockarjova et al. (2020) was employed instead of assuming a 5% annual rate of return as in Sutton and Anderson (2016). This method allows the integration of previous studies which assess the benefits people receive from ecosystem services parks provide.

In addition, the yield, or rate of return of the asset, is computed by finding the ratio of the estimated value of the flow of ecosystem services in 2020 relative to the valuation of the park.

Finally, the future growth rate of the ecosystem services was estimated using a simple dividend growth model. This is equal to the social discount rate of 3.5%, which is commonly used in cost-benefit studies for public projects such as health

intervention and policies in high-income nations (Boardman et. al, 2010; Haacker et. al, 2020), net of the yield obtained from the park in the year of investigation (provided the yield is lower than the social discount rate). In the case that the yield is higher than the social discount rate, the future growth rate will be negative to bring it closer to the social discount rate in the long run.

Results

The table below shows descriptive statistics. The average land value is $264,535 for 514 single detached residential homes on an average lot size of 0.088 hectares. Land values range from a minimum of $208,000 to $434,000. The size of the lot also has ranged from 0.038 to 0.85 hectares. When the land values are converted on a per hectare basis, the mean land value is $3.5 million, ranging from as low as $407K to a maximum of $5.9 million. However, it is worth pointing out that the value of land per ha from 1996 onwards (CDN$) as per the 2020 BC assessment, when the park was officially established, averages $3.96 million, while the value before, as per the 2002 BC assessment, averages at $3.05 million.

Table 1: Descriptive statistics of 514 residential houses by Kenna Cartwright Park

Variable	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Land Value	264,535	29,107	208,000	244,000	260,000	280,000	434,000
Building Value	338,350	118,650	49,900	247,000	316,000	397,250	893,000
Year Built	1994	16	1958	1976	1995	2006	2020
Size (in Ha)	0.088	0.058	0.038	0.057	0.072	0.098	0.850
Land value per Ha	3,496,417	1,010,246	407,136	2,784,241	3,424,265	4,253,906	5,928,365

Table 2 shows the ecosystem services per ha per year at USD $50,951 derived from the European transfer function (ETF) by using the 749 ha, Canada's GDP per capita (2016 US$, PPP) of $47,567 and the City of Kamloops population density of 301.7 square km. The 2020 value of ecosystem services is estimated at CDN$45.7 million and the value of the park at $2.96 billion from 1996 onwards for a yield of 1.5% and an implicit annual growth rate of ecosystem services of 2% equaling the social discount rate of 3.5%. Using the global transfer function (GTF) the price per ha per year increases to USD 65,312 resulting in annual ecosystem services of $58.6 million for a yield of 2% per year.

Table 2: Value of Kenna Cartwright Park and its ecosystem services

Characteristics	Kenna Cartwright Park
Ecosystem services per ha per year (USD) – ETF	$50,951

Characteristics	Kenna Cartwright Park
Ecosystem services per year (CND) – ETF	$45.7 million
Ecosystem services per ha per year (USD) – GTF	$65,312
Ecosystem services per year (CND) – GTF	$58.6 million
Value of green infrastructure – 1996 onwards (CDN$)	$2.96 billion
Social discount rate	3.50%
Estimated 2020 yield or rate of return – ETF	1.54%
Annual growth rate of ecosystem services – ETF	1.96%
Estimated annual yield or rate of return – GTF	2.00%

Discussion and conclusion

The preservation of Kenna Cartwright Park in Kamloops is without a doubt of significant value to its residents. A conservative value for Kenna Cartwright is estimated to be $2.96 billion and yielded $45.7 million in annual ecosystem services in 2020. The annual ecosystem services represent 1% of Kamloops' GDP based on a 4.6 billion GDP (Venture Kamloops, 2020). On a per-capita basis, the yield from Kenna Cartwright's ecosystem services amounts to approximately $500 for each Kamloops resident, and each person has $28.8 thousand worth of green infrastructure capital equally distributed. In addition, Kenna Cartwright Park is estimated to be 12.5% of the $24 billion in built capital.

The estimated 45.7 million CDN$ per year from Kenna Cartwright Park' ecosystem services is substantially lower than that of assuming a 5% yield as per the assumption of Sutton and Anderson (2016). The yield is lower because the nature park is a relatively riskless highly valued asset and its high

valuation captures the fact that the value of ecosystem services will grow in the future at 2% per year. The value of the 2020 ecosystem services is not constant but is estimated to increase at the rate of 2% per year, which is similar to the long-run growth rate of Canada's standard of living of 2% measured by GDP per capita. Using the GTF, the annual yield increases to 2% per year with a 1.5% annual growth rate of the value of ecosystem services. In the future, a survey should be conducted on visitors to determine the value of ecosystem services they enjoy from the park.

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3. McArthur Island Park

BHARDWAJ, SAARANSH

Introduction

According to Costanza et. al, 2017, "Ecosystem services' (ES) are the ecological characteristics, functions, or processes that directly or indirectly contribute to human wellbeing: that is, the benefits that people derive from functioning ecosystems". Moreover, the idea that natural ecosystems provide benefits that support human welfare is as old as humans themselves. Ecosystem services cannot be defined independently as they only exist if they contribute to human well-being as they benefit people consciously or unconsciously, directly or indirectly. The term ecosystem services first appeared in Ehrlich and Ehrlich in 1981 (Costanza et. al, 2017). Urban parks can be described as green spaces that provide a variety of ecosystem services that are beneficial to city dwellers' well-being, and they are also seen as a natural solution to a variety of urban issues. It's been difficult to put a precise monetary value on ecosystems and the benefits of their services in a world where, unfortunately, money indicates value. Part of the complexity stems from the fact that some people perceive ecosystems as priceless and essential parts of life.

This project helps in assigning a dollar value to urban parks in that it helps us to assess the benefits to individuals and

the whole community that is otherwise not well perceived. Also, most people understand values expressed in monetary units and are often a common denominator to express the contributions made by various ecosystems. The monetary valuation of ecosystem services like urban parks is a promising approach for highlighting the importance of ES to society and the economy, as well as for developing cost-effective policy instruments for nature restoration and management and for use in cost-benefit analyses. However, it is a misconception that valuing ecosystem services in monetary units is the same as privatizing them or commodifying them to carry out trades. Privatization would work poorly for urban parks as they are public goods or common pools.

McArthur Park

McArthur Island Park, on the north bank of the Thompson River, is a popular park in Kamloops, British Columbia. It is in the Thompson Shuswap region of British Columbia. The Park is a recreation, relaxation, activity, and sightseeing hub catering to the young and old in the community. Many of Kamloops' sports and recreation facilities are located on McArthur Island. The 51-hectare (126-acre) island boasts a variety of sports fields, a golf course, an indoor sports center, bicycle paths, parks and picnic areas, a lagoon, a wild flora and fauna reserve, a BMX track, walking trails, and much more (McArthur Island Park – Kamloops, 2022). The McArthur Island loop path is also a part of the larger Rivers Trail, which spans 40 kilometres. A

trail that takes you through Kamloops' neighborhoods', lakes, rivers, wetlands, and more (McArthur Island Park – Kamloops, 2022). McArthur Island Park also serves as a venue for sporting events such as tournaments.

Figure 1: McArthur Park. Source- https://www.kwsl.net/docs/McArthurIslandPark.pdf

Methodology

Putting a value on urban open space is one approach to assessing the importance of green infrastructure in cities. Contingency valuation, choice experiments, hedonic pricing, travel cost, and benefits transfer have all been used to determine the value of annual ecosystem services provided by urban parks. This paper aims to use the holistic approach proposed by Sutton and Anderson (2016). Sutton and Anderson (2016) assumed that the park generates a return in the form of ecosystem services, much like any other type of capital (e.g., human, constructed, financial). A well-diversified financial asset portfolio has historically yielded a 5% return. The land value is an accurate reflection of the urban park's value as it

represents an '*opportunity cost*' for the real estate in which MacArthur Park is situated. Secondary data collected from BC Assessment (2022) on the value of the land, the buildings, the year the house was built, and the size of land in square feet as utilized will aid us in putting the value to the park.

Results

Table 1 shows the descriptive statistics of 143 residential houses by McArthur Island Park. The data was accrued from BC Assessment (2020) and various variables like land value, building value, year built, size of household and land value per ha were scrutinized. The average land value is $248,350 for 143 residential houses surrounding the park. The highest land value was $690,000 and the lowest was $145,000, giving us the range of $545,000. The 3rd Quartile for land value is $273,000 which suggests that 75% of the land value lies below the $273,000 point. Moreover, the average land size of households is 8,528.83 ft2. The highest land size of a house was 59,667ft2 and the lowest was 2,160ft2. Moreover, the island can be accessed through roads from the eastern and northeastern sides which explains the location of commercial buildings like Gymnasium and Elementary school on that side of the park. This also explains the high density of buildings on both sides of MacKenzie Avenue.

Table 1: Descriptive statistics of 143 residential houses by McArthur Park

Variable	Mean	St Dev	Minimum	Q1	Median	Q3	Max
Land Value	$248,350	70,197	145,000	208,500	256,000	273,000	690,000
Building Value	305,699	88,337	121,000	236,000	311,000	354,500	693,000
Year Built	1972	13	1930	1965	1971	1978	2020
Size (in Ha)	0.08	0.08	0.02	0.05	0.07	0.08	0.55
Land value per Ha	$4,018,458	$1,319,430	$870,240	$3,328,897	3,866,509	4,405,214	7,225,773

McArthur went through a huge transformation during the 1960s and 1970s with the introduction of the Sports Plan in 1957, in which recreational playgrounds were to be built (Wallace, 2018). This explains the burgeoning of houses during that period. Out of 143 residential houses, 115 houses were built between 1960 and 1979 i.e., 80.41% of houses in our sample were built during that time- period. The oldest house dates to 1930 while the most recent one was built in 2020. Some of the older houses are found along Cambridge Cres, Barrie drive, Stewart Avenue and Kenora Road, which were built in the 1960s and 1970s. They are on the north and eastern flank of the island. Out of 143 houses, 7 were built in the 2000s. They are located along Happyvale Avenue and Holy St on the western flank of the park. The land value of these new houses varies from $4 to $5 million per hectare, which is high compared to other houses, but they have a small land size (between 3000-4000 ft2). The new houses have high building value and low land value which can be contributed to the building design.

The land values from BC Assessment were converted on a

per hectare basis and averaged to get a unit price. This unit price was then multiplied by the 51 hectares of park size to determine the park's estimated valuation which came out to 197 million. Moreover, Sutton and Anderson (2016) assumed a 5% return from the value of the park to represent the annual ecosystem services. The annual ecosystem services from McArthur Park are $9,850,000.

Figure 2: View from McArthur Park, https://www.alltrails.com/trail/canada/british-columbia/rivers-trail-mcarthur-island

Conclusion

One of the goals of this research was to demonstrate the value people place on McArthur Park as a form of capital that is being preserved for the benefits it provides; the urban park has the characteristics of a public good in that it is nonrival, provided there is no congestion, and non-excludable. Furthermore, the estimated non-market values for these ecosystem services frequently relate to use or non-use values rather than exchange values. Knowing the value of ecosystem

services is helpful in their effective management and carrying out the cost and benefit analysis that will help us to formulate better policies for the betterment of the park. Another goal is to provide information to local administrative units so that they can account for a cost-benefit analysis of the environmental losses caused by the removal of natural resources in the area. The annual ecosystem services from McArthur are priced at $9,850,000. Moreover, there is a limited scope of real estate development around McArthur Park as it is surrounded by water on three sides. However, the city has opened a new playground on McArthur Island (Wallace, 2021). It's behind the mini-golf course and is part of the city's long-term plan to turn the former McArthur Island Golf Course into a passive park (Wallace, 2021). This might see a huge influx of people into the park and might increase the benefits of the park to the community.

Figure 2: Yellow-bellied Marmots at McArthur Park by D-Stanley, CC BY 2.0.

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4. McDonald Park

TAGHIYEV, RASHAD

Introduction

Undeniably, urban parks provide lots of community benefits. Parks are green spaces in urban areas for the community to get out of their daily routine from gray to a more pleasant green space. Municipal parks are open access and are non-rival, provided there is no congestion, and thus yield collective benefits. They are provided and maintained by the local authorities who own the land. In this chapter, an assessment of the value of McDonald Park in Kamloops and the ecosystem services it provides will be examined, using the methodology described by Sutton and Anderson (2016) for the assessment of Central Park in NYC. Sutton and Anderson (2016) assumed that the real estate value of the area of Central Park was at least as much as its natural capital value. Applying an annual rate of return of 5% to the appraised real estate value of USD 528 billion, it arrived at USD 25 billion at the price of $73 million per hectare per year in ecosystem services mostly in the category of cultural and regulating. Assigning a dollar value to urban parks' ecosystem services is a difficult but necessary task. It can help make economic and policy decisions, such as deciding between commercial development and public use, or the right amount of investment for urban parks maintenance and development.

Figure 1: McDonald Park, Picture by Rashad Taghiyev

McDonald Park

McDonald Park in Kamloops (Figure 1) is one of the oldest parks in the city's North Shore area. It is a medium-sized urban park with an area of just under 3.05 ha. The park is packed with amenities and attractions, which serve the pretty dense community surrounding it. According to The City of Kamloops, the following are some of the park's facilities. It boasts 3 open-air basketball courts and 3 open-air pickleball/tennis courts. Also, it has a multi-use pathway. There is a leashed dog park available inside the area. Throughout the summer a 'Music in the Park' entertainment is hosted in the park's small bandshell. Kids can enjoy a water spray park during the warmer season. Public washrooms, 4 picnic tables, and a gazebo are present in the park too. Free public parking is also available for park visitors. Kamloops Child Development Centre, which is a non-profit that provides nature-based childcare for children from

birth to 12 years of age is across the street from the park The 25th annual “Boogie the Bridge” running and walking event which is also a big fundraiser for Kamloops will have its start and finish in the park in 2022.

Figure 1: McDonald Park from City of Kamloops Maps

Method and Results

Here we start by following the same hedonic pricing methodology as Sutton and Anderson, (2016). Descriptive statistics of 36 properties adjacent to McDonald Park are presented in Table 1 (BC Assessment, 2022). The median land value for the properties adjacent to McDonald Park is CND 4.3 million per ha. This means that the total value of McDonald Park can be estimated as CND 13.1 million since the total area

of the park is about 3.05 ha. The relatively high per hectare values reflect the density of the housing in the area. Applying a simple annual interest of 5% gives the per annum value of McDonald Park's ecosystem services as CND 0.65 million. Alternatively, the ESVD database provided data gives per hectare per annum value for Urban Parks & Forests as CND 135,971 which equals CND 415,000 for the whole park. This number is equivalent to approximately 3.2% annual yield.

Table 1: McDonald Park Descriptive Statistics

Variable	Mean	StDev.	Min.	Q1	Med.	Q3	Max.
Land value	217,472	81,649	_	221,500	249,500	256,000	304,000
Building value	251,642	138,930	78,000	151,750	235,000	322,750	807,000
Year built	1962	23	1924	1950	1955	1965	2020
Land size (ha)	0.045	0.025	_	0.033	0.056	0.060	0.094
Land value per ha	3,692,937	2,010,375	_	3,595,661	4,292,147	4,467,019	7,474,931

Discussion and Conclusion

The CND 0.65 million per year of ecosystem services valuation of an asset worth 13.1 million CND is a quick and straightforward way to measure the value of the park to the city inhabitants, especially those who live close by and use the park's multiple amenities frequently. The annual interest rate of 5% from Sutton and Anderson (2016) used here is at the top

of the range of possible valuations. The ESVD assessment gives a yield of 3.2% which is similar to the social discount rate of 3.5% (Boardman et al, 2010). In my opinion, it is reasonable to value the McDonald park using at least a 3.2% yield or approximately CND 415,000 per annum. It is located in an area with dense housing and many people from the neighborhood visit the park for recreational purposes, to spend time with their children, or to walk their pets in the dog park. The nearby Child Development Center also uses the park for open-air activities with children. I believe that the value of the McDonald's park to the neighborhood community is large enough to continue to keep it as a public green space.

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5. Peterson Creek Nature Park

SHEMO, UMMA

Introduction

An urban park is an ecological function and process that provides spiritual, recreational, aesthetic, and social benefits to the human and community. Moreover, urban parks are categorized as Green Infrastructure (GI). Mell (2008) argues that Green Infrastructure (GI) is "the physical environment within and between cities, towns, and villages. The network of open spaces, waterways, gardens, woodlands, green corridors, street trees and open countryside that brings many social, economic, and environmental benefits to local people and communities" (p. 73). Urban parks provide several ecological benefits such as cultural and recreational facilities, wildlife habitat, pollination, climate regulation, and disturbance regulation. Costanza et al. (2017) stated that " 'Ecosystem services' (ES) are the ecological characteristics, functions, or processes that directly or indirectly contribute to human wellbeing: that is, the benefits that people derive from functioning ecosystems"(p. 3). This study's aim is to estimate the value of Peterson Creek Nature Park (which is in Kamloops, in the interior of British Columbia) through holistic

and benefit transfer methods, which were used by Sutton and Anderson (2016) to estimate the value of ecosystem services provided by Central Park in New York City.

Peterson Creek Nature Park

Figure 1 shows a satellite view of 94 hectares size of Peterson Creek Nature Park and its surrounding areas such as Downtown Kamloops and Upper Sahali.

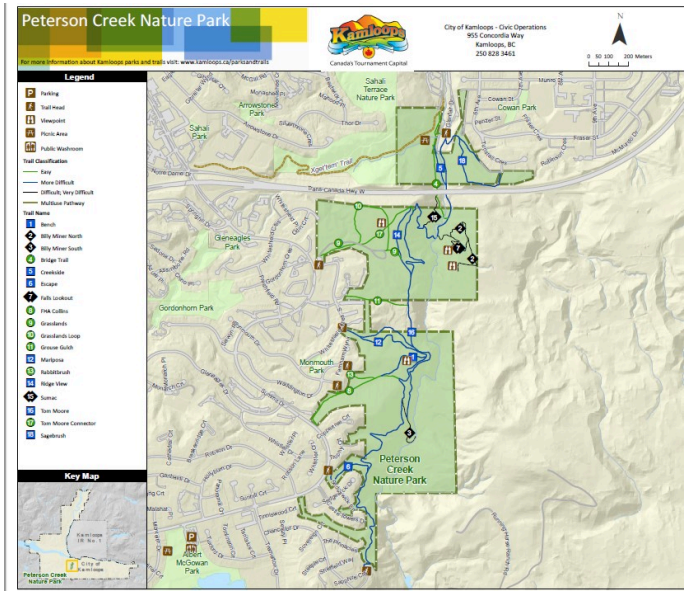

Figure 1: Peterson Creek Nature Park and surrounding area in Kamloops from City of Kamloops Map

Peterson Creek Park is one of the best hiking trail parks in Kamloops, and the park offers 30 km of hiking trails. In

addition, the trails are varied from easy to most complex and offer an astonishing city view, and the park has several entrances, but two main entrances have parking facilities: for instance, Downtown and Summit Drive entrance (City of Kamloops, 2022). The park has a picnic area located at Columbia Street, near 6th Avenue; further, "this park includes the Xget'tem' Trail multi-use path, which opened in Fall 2018" (City of Kamloops, 2022). The park has a waterfall called Bridal Veil Falls; by strenuous hiking, anyone can enjoy the dazzling view of the falls.

Figure 2: View from Peterson Creek Nature Park. Picture by Umma Shemo.

Methodology

This study used holistic and benefit transfer methods to evaluate the value of Peterson Creek Nature Park, which was

used by Sutton and Anderson (2016) to estimate the value of ecosystem services provided by Central Park in New York City. Moreover, to estimate the total value of Peterson Creek Nature Park data is collected from BC Assessment (2021). This study showed land values of the surrounding area of Peterson Creek, which is a total of 42 land values with 41 single-detached homes and one hospital, were used to assess the park's value. The land values are converted per hectare basis and calculated as the averaged value to get the per hectare price of the land. Then, the average per hectare value of the land was multiplied by the 94 hectares of park size to demarcate the park's assessed valuation. Sutton and Anderson (2016) assumed a 5% return from the park's value to represent the annual ecosystem services; hence, the study used this method to evaluate the ecosystem services that Peterson Creek Park provides. Furthermore, the study also applied ESVD database for estimating the value of ecosystem services that the Park delivers.

Result

Table 1 demonstrates descriptive statistics of the relevant variables obtained from the BC Assessment website. The average land value is $434,071 for 41 residential houses and one hospital, and the average land size is 0.196 hectares. Land values vary from a minimum of $297,000 to maximum $2,291,000, although 75% (Q3) of the values are less than $404,750. The land values are converted on a per hectare basis,

and the study finds average land value is $3,258,548, ranging from a minimum of $755,745 to a maximum of $5,426,390.

Table 1: Descriptive statistics of 41 residential houses and one hospital by Peterson Creek Nature Park

Variable	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Land Value	434,071	306,268	297,000	344,750	371,000	404,750	2,291,000
Building Value	952,381	2,477,559	228,000	409,250	542,000	742,500	16,570,000
Year Built	1984	13	1954	1975	1987	1993	2011
Size (in Ha)	0.196	0.348	0.066	0.093	0.108	0.165	2.149
Land value per Ha	3,258,548	1,066,344	755,745	2,535,667	3,269,380	4,096,652	5,426,390

Using the average land value, the study estimates that the total value of Peterson Creek Park will be $306 million and contributes $15.3 million in annual ecosystem services. Further, if one uses the value of ecosystem services per hectare per year for green infrastructure of US$109,503/ha/year (ESVD, 2020) translating to Canadian at the exchange rate of 1.25 CDN per US yields CDN $136,879 per ha per year giving annual ecosystem services slightly lower at $12.8 million or a yield of 4.2% per year.

Discussion and conclusion

This study found the value of Peterson Creek park at $306 million with ecosystem services per year in the range of $12.8 – 15.3 million. Estimating the value of urban parks and ecosystem services is challenging because the urban area community is unaware of their values. Further, seasonal diversity will be another challenge, and the intrinsic values that communities get from the urban park will not be measurable. Nevertheless, by assigning a dollar value to urban parks, the community will know the value of good mental health, conservation facilities of the park will increase, and awareness of protection among the community will develop.

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6. Prince Charles Park

IBEKWE, ADAKU

Introduction

Located right in the middle of the downtown residential area, Prince Charles Park is a relaxing piece of nature that provides recreational value for residents. With its proximity to homes primarily occupied by families and its well-maintained lawns and child-friendly amenities, it can be a notable deciding factor for families when compared to similar places without a park in proximity. Urban parks are one simple example of Green Infrastructure (GI) integrated with natural systems for the purpose of preserving natural systems but also providing services for human benefit (Ely and Pitman,2012). This paper attempts to assess the value of Prince Charles Park using revealed preference of land prices and discuss what is insufficient and other elements that might lead to a more accurate valuation.

Figure 1: Prince Charles Park. Picture by Adaku Ibekwe

Prince Charles Park

The Prince Charles Park is a serene, natural space that has been set aside for aesthetic purposes and recreational use in the city of Kamloops, British Columbia. It is nestled between 11th and 12th avenue, Nicola Street at its north, and Columbia at its south side. Located in an urban neighborhood downtown, it is surrounded by predominantly single-story residential buildings on all four sides. The park is largely flat and grassy with a variety of trees and shrubbery intertwined with walking trails for visitors. A few amenities have been added to the landscape over time to increase its recreational draw. Targeted largely at young children, these amenities enhance the park's value while providing an incentive to preserve. A wading pool, playground sets, basketball hoop, public washroom, picnic tables, and open field that hosts various team sports and cultural events in warmer weather can all be found in its vicinity.

Figure 2: Prince Charles Park in Kamloops from Google Maps

Methodology and results

The Prince Charles Park occupies an entire block with approximately 25 homes surrounding the park. Based on a city of Kamloops map, it sits on approximately 1.3 hectares of land. Following Sutton and Anderson's hedonic pricing method, 20 properties were chosen from adjacent blocks and the current market land values were assessed. The average market price per hectare has then been applied to Prince Charles Park. Ecosystems services were estimated at a 5% return on investment in adherence to the Sutton study as well. Since the average value of equal-sized land in the residential blocks surrounding the park is $6.1 million per hectare (Table 1). This puts the land value of the park at roughly $8 million. The

ecosystem services provided based on this value would be $396,500 per year. A more conservative assessment would be to use the ESVD database which prices ecosystem services at USD $100,000 per ha per year. At the current exchange rate, of 1.25 CND per 1 USD, the estimate would yield a value of $125,000 CND. This translates to $162,000 annually in ecosystems services (or a 2.1% annual yield). An older estimate was $6,661 ($11,470 in 2020 dollars) from Constanza's ecosystem review. These variations emphasize the essential role of human, natural, and built capital interactions and how that shapes the flow of benefits from different green infrastructures (Sutton and Anderson, 2016).

Table 1: Descriptive statistics of 20 houses around Prince Charles Park

Variable	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Land Value	344,500	25,510	314,000	323,000	347,500	369,000	369,000
Building Value	236,315	74,166	117,000	180,000	223,000	273,500	393,000
Year Built	1946	2	1942	1946	1946	1948	1948
Size (in Ha)	0.06		0.14	0.14	0.06	0.06	0.06
Land value per Ha	6,180,143	457,646	5,632,990	5,794,445	6,233,962	6,619,660	6,619,660

Discussion and conclusion

Acknowledging the diversity of benefits from urban parks is key in evaluating GI and must be integrated into the value

mapping approach process (Kati et al,2016). This valuation supports that the flow of benefits from GI is greatly reliant on the spatial interactions of human, natural, social, and built capital. The major takeaway is existing frameworks of holding all other variables at constant as is often the economic norm, lead to disastrous undervaluation of GI. That said, the assumption being that the value of this park is at least equal to the revealed preferences of surrounding land price alone, still leaves space to underestimate the value of this park (Sutton and Anderson 2016). The values estimated in this paper only serve as a guide that will encourage nuanced frameworks and policies to be developed aimed at preserving Prince Charles Park and other green infrastructure in the Kamloops community.

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7. Riverside Park

ABUBAKAR, LEILA

Introduction

Urban parks are green spaces that provide a vital and essential service as population and urbanization continue to proliferate; more than 50% of the world population currently resides in urban areas, with a projected increase to 68% in 2050 (Ritchie & Roser, 2018). This continuous change in the urban makeup will put added pressure on existing urban parks, which will need to be resourced and enhanced effectively to continue offering the necessary provisions to society. The Riverside Park occupies a prime land area in downtown Kamloops Valuation of the Park puts a monetary value on the park, providing a better tool to policymakers when deciding the importance of urban parks and how resources should be allocated. This paper aims to estimate the value of green infrastructure and ecosystem services of Riverside Park using the Benefit Transfer Method (BTM).

Established in 1902 as Kamloops's premier city park, Riverside Park is located in the City of Kamloops south of the Thompson River and north of the city's downtown core; it is twenty-five hectares in size spanning from above 3rd Avenue on the right to where Victoria Street joins the riverbank on the left. (Menard, 2006). Figure 1 below is a satellite image of Riverside

Park showcasing the Thompson River, the beach, some of the available activity facilities, and the adjacent landscape. The park provides a wide array of amenities that includes a water park, picket ball, and tennis courts, and its most notable is the Rivers Trail that runs along the entire northern edge of the Riverside Park to Pioneer Park along Waterfront Park, allowing for both walking/running or cycling and Public beach access (Menard, 2006).

Figure 1: Riverside Park in Kamloops from City of Kamloops Maps

The city of Kamloops has done a commendable job of creating an exceptional park system in Kamloops preserving green spaces within the city of Kamloops in a diverse and sustainable fashion that has created an interconnected, inclusive, and accessible park system that provides an avenue for healthy, active living for residents and visitors of the city of Kamloops (Oasis of Activity: City of Kamloops, Parks Masterplan, 2013).

Figure 2: View from Riverside Park. Picture by Sheikh Rahman

Methodology

To estimate the value of the park and the ecosystem services derived from Riverside Park, the Benefit Transfer Method (BTM) used by Sutton and Anderson (2016) to assess the Value of NYC Central Park will be used. The data for the analysis were retrieved from BC Assessment (2022) for 22 commercial and residential properties adjacent to Riverside Park. The land values of the data set were converted to hectares and averaged to get a unit price which was then multiplied by 10.51 hectares, the size of Riverside Park (Kamloops, C. of, n.d), to determine the park's estimated value.

Results

Table 1 below shows data collected from BC Assessment (2022) on land value, building value, and the year it was built; the average land value is $428,857 on an average lot of 0.0992. Land values range from $126,000 to $1,045,000. 75% of the land values are less than $540,000. The majority of the properties adjacent to Riverside Park are commercial properties due to its proximity to Kamloops downtown area; out of 22 land values collected, 13 were commercial properties, 4 were residential properties,3 were vacant land, and 2 were residential were parking lots spaces. The mean (average) land value of one hectare of land adjacent the Riverside Park is $5,445,798. Riverside Park occupies 10.5 hectares of land; using the average value of properties close to the park to determine Riverside Park's estimated value would value the land the park sits on at $57,180,879. Ecosystem Services Valuation Database (ESVD) values the ecosystem services for Urban parks and forests at USD 100,000 per hectare annually or CDN $125,000 at the current exchange rate; using this estimate would value the ecosystem services provided by Riverside Park at $1,312,500 annually or an annual yield of 2.3%. Using the Sutton and Anderson (2016) 5% yield, the ecosystem services would be estimated at $2,859,094 per year.

Table 1: Descriptive Statistics of 22 properties adjacent to Riverside Park

Variable	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Land Value	428,857	250,125	126,000	245,000	361,000	540,000	1,045,000
Building Value	764,092	1,250,550	77,200	233,000	305,000	628,000	4,801,000
Year Built	1950	35	1901	1912	1958	1977	1996
Size (in Ha)	0.0992	0.0786	0.0223	0.0409	0.0628	0.1628	0.2608
Land Value per Ha	5,445,798	1,943,463	1,560,541	3,777,993	5,691,820	6,698,517	8,780,647

Discussion and Conclusion

Urban Parks such as Riverside Park plays a vital role in the lives of urban dwellers, and the city of Kamloops recognizes its importance and listed the following as the goals of its parks (Menard, 2006)

- Ensure citizens of Kamloops have adequate opportunities for personal growth in leisure.
- Protect, preserve, and enhance the environment for the enrichment of the community
- Ensure public parklands are distributed equitably throughout the community.
- Develop and maintain an aesthetically appealing environment.
- Support the development of a strong community image.

Urban parks improve local economies and promote job creation by promoting tourism and attracting business ventures. Parks make cities more resilient and attractive, playing an essential role in neighborhood revitalization and reducing criminal activities; they attract visitors from surrounding areas and allow engaging activities (Park & Kim, 2019). Riverside Park has a robust summer festival that attracts visitors from all over. Bryant Park in New York City was known for high crime rates until the renovation of the park saw it attract 20,000 visitors daily, and rent for nearby commercial properties increased by 115-225% (Park & Kim, 2019). Riverside Park provides essential ecosystem services such as providing habitat for many animal species and a wide array of plant species, including over 100 years old trees. The Peter Wing Rose Garden (Menard, 2006) mitigates air pollution and reduces noise (Jiang et al., 2019). Urban Parks have been proven to deliver health and psychological benefits to citizens and visitors by providing a platform for physical activity and relaxation (Jiang et al., 2019). The continual enhancement and maintenance of Riverside Park have value for its residents, at its estimated value of $57,180,879 land value and annual ecosystem benefits in the range of $1,312,500 to $$2,859,094 per year. As more and more people migrate to the cities, developing green infrastructures to promote sustainable communities becomes more critical (Jones et al., 2015). Residents and cities are becoming more conscious of the importance of urban parks in contributing to communities' economic, environmental, and social welfare. Estimating the monetary values of green infrastructure such as urban parks will further reinforce its importance by communicating their value in a universally understood language; monetary will

inform policy and decision-making and prioritize the continual development and maintenance of urban parks such as Riverside Park.

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8. Rose Hill Park

WAITHE, DAVID

Introduction

Rose hill park is in Kamloops, B.C., ~5km from the city center occupying 11 hectares in the silt benches grassland overlooking the city. Kamloops residents are fortunate to have a unique park with quality recreational amenities and a panoramic view many would call a million-dollar-view (Figure 1). Colloquialisms aside, this paper will provide a valuation of rose hill park. This is important to the residents and city officials to ensure the value is not overlooked or ignored. The city will also benefit from fully accounting for its green infrastructure and urban park assets: "Standing, intact, functioning ecosystems produce many valuable services, which are often more significant than what results from their extraction and exploitation." (Costanza et al., 2017).

Figure 1: View from Rose Hill West Disc Golf Course Hole 4, Photo taken by Dave Waithe

Description of Rose Hill Park Amenities

1335 Rosehill Rd, Rose Hill Park is an 11-hectare city park ("Kamloops Disc Golf Club", n.d.) located ~5km from the center of downtown Kamloops. This dog-friendly off-leash park includes: a maintained outhouse, three picnic tables—one with a gazebo cover—a water fountain and a dog bowl filling station, a grassy play area, two tennis courts that double as four pickleball courts, access to a wide variety of hiking, walking, running and biking trails, and a full 18-hole championship level disc golf course. The park is situated under and around high voltage powerlines limiting its potential for development in an area with a highly valued panorama view of the city. The park includes parking for 20 vehicles and has overflow parking

available on the roadside, and in the community mailboxes for a large portion of the residents of the subdivision above the park. Personal observations indicate that the park consists primarily of an urban park and forests biome with sparse tree coverage, ponderosa pines, bunch grass, sagebrush, and cactus.

Figure 2: Rose Hill Park in Kamloops from https://geoprodsvr.kamloops.ca/citymap/

Methodology and Results

Using a simplified hedonic pricing valuation like Sutton and

Anderson (2016), I have assessed the market land value of 45 residential properties surrounding the park (BC Assessment, 2022) (Table 1), and applied the average price per hectare to Rose Hill Park. Additionally, the value of the ecosystem services provided by the park is added to this land valuation with the Urban Parks & Forests biome services value of approximately $138,000/Ha/year ("ESVD", 2022), equaling a flow of $1,518,000 to the city in ecosystem services per year. The average value of land/Ha in the area around the park is $1.56 million (BC Assessment, 2022) (Table 1), putting the land value of the park at $17 million. Sutton and Anderson (2016) used a 5% return on the value of the asset which suggests ecosystem services per year at $850,000. The development pressures are not the same between Rose Hill Park and Central Park, but the reasoning for using the hedonic pricing method still stands. If the park is valued at less than the average value per hectare of adjacent residential property, the public will not support it; it would be switched over to residential development. Using the ESVD, 2022 database the ecosystems services provide a flow of $1,518,000 per year or an 8.9% rate of return based on the market value of the park of 17 million.

Table 1: Descriptive statistics of 45 residential properties around Rose Hill Park

Variables	Mean	stDev	Minimum	Q1	Median	Q3	Maximum
Total Value ($)	1,115,911	1,013,411	279,000	868,250	951,500	1,017,500	1,698,000
Land Value ($)	510,222	936,939	267,000	304,500	366,500	412,500	577,000

Variables	Mean	stDev	Minimum	Q1	Median	Q3	Maximum
Building Value ($)	648,952	180,539	411,000	540,000	579,000	700,000	1,330,000
Year Built	1981.5	10.90	1970	1975	1977	1980	2014
Land Size (Ha)	0.75	3.42	0.16	0.18	0.21	0.29	0.49
Land Value per Ha ($)	1,567,860	333,855	285,941	1,423,143	1,593,889	1,771,884	2,118,044
Value of Park	17,246,460						

Discussion and conclusion

Rose Hill Park is an incredibly valuable property to the city of Kamloops, this valuation is made in hopes of the proper accounting of city resources and for the advocation of further investment in parks and green infrastructure that provide benefits in so many ways.

Green infrastructure is a range of infrastructure that uses plant, or soil systems to provide a service much like gray infrastructure concrete streets, sewers, and pipelines. This can be stormwater management, biodiversity, temperature moderation, walkways…. etc. “green infrastructure is an interconnected network of green space that conserves natural ecosystem values and functions and provides associated benefits to human populations. Green infrastructure is the ecological framework needed for environmental, social and economic sustainability” (Benedict & McMahon, 2002).

The benefit of not converting the park to residential development is that its yield of 5 – 8.9% exceeds many other

public projects which would yield a 3.5% as per the social discount rate commonly used in cost-benefit studies as an opportunity cost and when the benefits will be seen in less than 50 years (Boardman et al., 2010). Furthermore, residential properties at Rose Hill are large averaging 0.75 ha (Table 1), and hence on an 11 ha land, there would be only 14 houses built. Moving from public good that yields community benefits to a private good would not be accepted by the community. In addition, it is not a good investment for the city to sell the land most likely at less than $17 million, say 9 million, and invest the proceeds in another public good at the social discount rate of 3.5% for $315,000 per year when Rose Hill park provides $850K – $1.5M of ecosystem services.

With an estimated valuation of $17 million and ecosystem services in the range of $850,000 to $1,518,000 between the Sutton and Anderson 5% return and the ESVD transfer benefit assessment, an alternative approach for validation is, to use a travel cost study to more precisely value the recreational service provided, as Rose Hill West disc golf course saw over 10,000 rounds of disc golf played in 2021 (UDisc, 2022); and will be hosting the largest disc golf tournament in Canadian history seeing players travel across the country and internationally to take part in the Tournament Capital Open in 2022 ("Tournament Capital Open", 2022). This additionally revealed preference valuation will add to the realized assets the city can account for while making decisions on future spending for recreation and land development, as well as encourage the development of more green infrastructure. If the city were to sell the land for development, there would be a net loss as the social benefits would be converted to private and the proceeds

from the sale would have to be invested in other public goods that yield a return on investment that is greater than 8.9% per year. At a social discount rate of 3.5%, this would be very hard to find.

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9. Westsyde Centennial Park

AJANI, AYOOLA O.

Introduction

Urban parks are one of the most essential areas of cities, and their role in the lives of city dwellers has evolved. This role has spanned anything from providing relaxation to acting as a mediator between humans and nature. (Sadeghian & Vardanyan,2013). As people continue to migrate to cities, the importance of green infrastructure planning has caught scientists in designing sustainable communities. (Jones & al., 2015). Moreover, cities and residents are becoming more conscious of the importance of urban parks in ensuring the economic, environmental, and social welfare of their communities; therefore, by estimating the monetary value of the benefits provided by green areas such as urban parks, gardens, and other green spaces will motivate city officials to communicate significant information for the planning of urban parks and prioritize their maintenance. (Olbińska, 2018). In this case, I'll attempt to estimate the value of the Westsyde Centennial Park by valuing the houses that surround the park; as it was proven by scientists that people are willing to pay a higher price for renting or purchasing a house near green

areas.

The Westsyde Centennial Park is one of the multi-purpose and family-friendly parks in Kamloops BC. It is located along the west bank of the North Thompson River at the end of Franklin Road in Kamloops. The Westsyde Centennial Park occupies an area of 102,368m2 or 10.2ha (Kamloops CityMap, 2022). The park has plenty of amenities which include – a waterpark/ splash park for younger children, and a fenced dog park area attached. This dog park is an off-leash area located on the NE side of the dyke only. It has a therapeutic Little Farmers Petting Zoo (located at the entrance of the park off of Franklin Road). It also has a skating rink for skateboard enthusiasts, three soccer fields, one slo-pitch diamond, a multi-purpose arena, a pump track, a playground for adults and kids, four picnic tables as well as two public washrooms for convenience. The park has free parking for visitors. (City of Kamloops, 2022)

Figure 1: Little Farmers Zoo. Picture by Ayoola Ajani

Methodology

Adjacent Areas refer to residential land areas around the park that share a direct border with the park. Close Areas refer to the residential land areas that are near the park but do not share a direct border with it. The data for this analysis was obtained from the BC Assessment registry (2022). The land values and several other statistics such as land values, building values, total value, year built, land size, land area in hectares, first and second-floor areas and basement finished area were all taken for 33 adjacent and close residential houses to the park. The areas were chosen such that an equal number of houses was considered from all sides of the parks. The choice of these areas is illustrated in Figure 2. This analysis transfers the values of the land that is adjacent to the urban park. The land values are assumed to be a result of the presence of the urban park.

Fig 2. Image of Westsyde Centennial Park area, Source: Source: Kamloops CityMap, https://maps.kamloops.ca/PropertyReports/htmlpages/P20970.html

Results

The data in Table 1 is secondary data collected from BC Assessment (2021) on the variables such as the value of land and buildings, the year built, size and the value of land per ha around the Westsyde centennial park. The mean land value of properties adjacent to this park is $269,000 while the mean building value is $383,713 and the highest building is valued at $697,000. The mean land value per ha is over $3m. The area has very few new buildings. The oldest house was built in 1972 and the newest in 2021. The average year the houses around this park were built is 1986. This indicates that most building around the park is old. The average land value of land is $3.6m per ha which isn't distant from the median land value of $3.5m.

Table 1. Descriptive statistics of 33 residential houses by Westsyde Centennial Park

Variable	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Land Value	269,000	35,947	238,000	253,000	257,000	285000	425,000
Building Value	383,713	148,034	188,000	283,000	333,100	472500	697,000
Year Built	1986	20	1967	1972	1973	2013	2021
Size (in Ha)	0.0895	0.0824	0.0465	0.0572	0.0724	0.0951	0.5180
Land value per Ha	3,646,315	1,005,596	820,466	2,989,344	3,547,822	4,535,220	5,114,002

The Westsyde Centennial Park occupies an estimated 10.2ha of land (Kamloops CityMap, 2022). The average land value per ha in the area is $3.65m. This means the land value of the park is $37,192,413. The current value of ecosystem services provided by Urban parks and forests is listed as about USD $ $109,503 /ha/year (ESVD,2020) at the current exchange rate this translates to CND 136,879 yields annual ecosystem services of $1,413,312 or a yield of 3.8% per year in ecosystem services. Using the Sutton and Anderson 5% rate of return per year, the park value would have a yield of $1,859,620 per year.

Discussion and conclusion

If the land area of the park is developed as residential properties with the current average land size of 0.09 hectares, the park size would have been able to accommodate approximately 114 houses benefiting 45 households. However, this converts the social benefits of green space into private

benefits and would require community approval through a referendum since the community will lose a public good. Furthermore, since the park will be absent if developed, the property values could potentially decline in the absence of the park. Also, the houses built in the park require a lot of resources private and public, and the houses will yield service to the owners in terms of private returns, while the park provides ecosystem services to the community at large and requires few public resources at a much lower cost with social returns. In addition, the municipality would most likely sell the park at a lower price than $37.2 million and would have to find a public project that yields higher returns. Finding projects that yield more than 4-5% is very unlikely. Hence, such a sale is not recommended. It is also important to note that ecosystem services do not flow directly from natural capital to improve human well-being but result from complex interactions of human, social, natural, and built capital that improve well-being (Costanza et al. 2014). The social annual yield of 4-5% would be difficult to replicate with a conversion of the public park to private usage. The value residents derive from the interactions of all forms of capital makes the park much more valuable.

River trail next to Westsyde Centennial Park. Picture by Ayoola Ajani

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10. Valleyview Nature Park

RAHMAN, SHEIKH FARZIN

Introduction

The Valleyview Nature Park in Kamloops offers the residents of the city a very different type of park. The Valleyview nature park has trails that are mainly out in the open and high above on the silt buffs of Valleyview. This park is right beside the Kamloops Bike Ranch, so there are always riders on the trails. Even though the park does not have multiple trails compared to other parks in Kamloops like Kenna Cartwright or Peterson Creek, the trails of Valleyview Nature Park are unique and are somewhat less visited by residents who wish to explore. The Rim Loop is one very specific and famous trail of the park among the visitors, mainly because of the view it provides from high above the silt cliffs.

Figure 1: View from The Rim Loop from https://hikekamloops.ca/rim-loop/

Many residents claim that the variety of trails allows them to discover the hidden beauty of the Kamloops in this somewhat small and uncrowded park. Even though there are no streets surrounding the park, it can be reached if driven along the Highland Road. Residents from Valleyview Drive would have somewhat easy access to it as the park is located south and adjacent to the street (Hike Kamloops, 2020). This article has attempted to evaluate and estimate the value and the value of the ecosystem services provided by this approximate 80.7 hectares park to the local community.

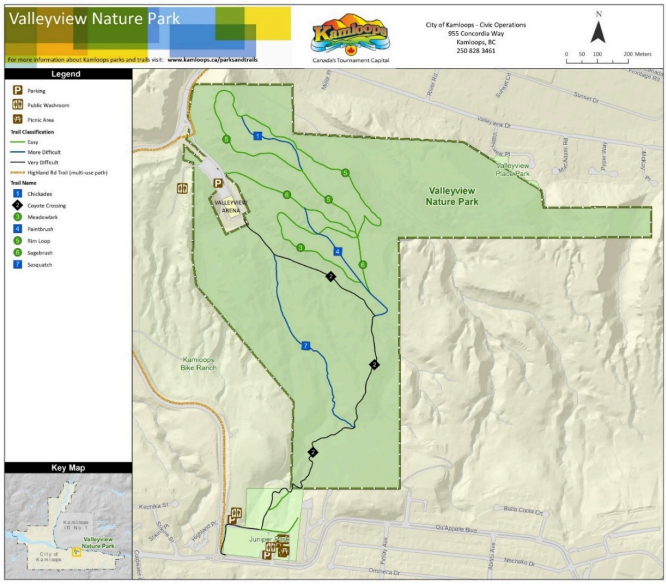

Figure 2: Valley Nature Park from https://www.kamloops.ca/sites/default/files/docs/city-services/valleyviewnaturepark-web.pdf

Assessment

For the purpose of the evaluation, 20 adjacent properties to the park were evaluated using data from BC Assessment and the descriptive statistics of the respective 20 residential houses are provided in Table 1 (BC Assessment, 2022). As seen in Table 1, the land value and building value of adjacent residential houses are estimated to have an average of $317,000 and $341,000 respectively. The hedonic pricing valuation method from (Sutton and Anderson, 2016) was used to assess the land value of the 20 adjacent residential properties next to Valleyview Nature Park. According to (ESVD, 2022) the ecosystem services provided by urban parks are estimated to be approximately CND 138,000/Ha/year. Given the size of

Valleyview Nature Park, which is approximately 80.7 hectares, the park should provide ecosystem services amounting to $11.14 million per year to the community. According to Table 1, the average land value per hectare is estimated to be $2.2 million. These figures thus give the land value of the park to be approximately $177.54 million. Therefore, the social return or social yield arising from the park is 6.2% per year which is higher than Sutton and Anderson, (2016). According to (Boardman et al., 2010), the social discount rate for benefits to be observed within the 50 years is assumed to be 3.5%. Thus, selling the park, most likely below its market value of $177.5 million, and investing the proceeds in public projects yielding a 3.5% as per the social discount rate is not recommended as the social return is 6.2% much higher than the 3.5% social discount rate. Furthermore, the community would be sacrificing social benefits in exchange for private benefits which would be rejected in a referendum. Removing the park from public use, at a lower price than $177.54 million, and replaced by about 300 residential properties given the size of the park of 80.7 ha and the average size of 0.26 ha per residential property in the vicinity of the park would not be a wise decision.

Table 1: Descriptive statistics of 20 residential houses by Valleyview Nature Park

Variable	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Land Value	$317,100	$59,598	$193,000	$281,250	$311,000	$365,250	$419,000
Building	$341,000	$87,545	$207,000	$281,000	$338,500	$406,500	$542,000

Variable	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Value							
Year Built	1971	16.66	1945	1960	1970	1989	1993
Size(in Ha)	0.258	0.269	0.057	0.117	0.164	0.249	1.048
Land Value per Ha	$2,202,943	$1,279,423	$195,581	$1,356,877	$2,157,280	$2,967,590	$4,677,250

Discussion and Conclusion

Recreation and culture are two important ecosystem services provided by urban parks (ESVD, 2022). City environments are stressful for the inhabitants and so the recreational features of the urban parks are termed as one of the highest valued ecosystem services provided by them, especially in cities. Urban parks have manifold possibilities for recreation which enhances human health and well-being. Urban parks also play an important role as providers of aesthetic and psychological benefits that can enrich human lives with meanings and emotions. These benefits from urban green spaces are known to reduce stress and increase physical as well as mental health. (Gómez-Baggethun E. et al., 2013). The residents of these neighborhoods have easy access to Valleyview Nature Park which is famous for bike riding and hiking for all its trails. Most of the houses were built around the 1970s and the lands were on average a size of 0.26 hectares. The average land value of the adjacent properties was estimated to be around $2.2 million per hectare. It can be observed that Valleyview Nature Park is seen as a form of capital that the residents want

to preserve for Kamloops, especially because of the benefits it provides. The recreational and cultural ecosystem services it provides are considered to be a public good, that is they are non-rival and non-excludable and thus provide aesthetic values to the citizens of the city. The land value around the parks was seen to be ranging from $193 thousand to $419 thousand for the properties used in this study. The study hence leads to the suggestion, that the authorities of the city should definitely not only take into account the market and economic benefits of the Valleyview Nature Park, but also the costs and benefits associated with the residential capitals nearby, and most importantly, the major environmental, recreational and cultural losses that could occur to the city if the park is not preserved. Thus it can be stated that the ecosystem services provided by Valleyview Nature Park are indeed tangible services, and they also tend to have a direct effect on the residential houses, the land values, and the building values nearby. These services are hence providing economic incentives for further conservation of the Valleyview Nature Park.

Kamloops is named “The Tournament Capital of Canada” and “Nature’s Playground” as it consists of outdoor activities for every individual. Starting from Professional Mountain biking to hiking, the city calls adventurers in every season. It has trails for hiking and walking on all levels as the entire city is built of a wave of hills, and Valleyview Nature Park as discussed above plays a major role in what the city provides (Hodgins, 2016). As the park has a valuation of approximately $177 million and provides ecosystem services between $8.88 – 11.14 million per year as in the (Sutton & Anderson, 2016)’s 5% annual return and

the (ESVD, 2022) assessment. Further research must be carried out to further validate or evaluate these results. One of the more accurate ways for further assessment could be the Travel Cost Method. The data collected from the Travel Cost Survey could help the city develop its park and trail maintenance plans and priorities, and could also assist to provide data that are used to apply for grant funding. However, as the article suggests, the city should focus on the development and maintenance of its parks, and Valleyview Nature Park must be one of them.

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11. Conclusion

Valuing the natural environment and its ecosystem services is of paramount importance for municipalities and communities in order to protect, manage and enhance the quality of life of the community. People need green spaces in cities and towns to get away from their daily routines and find calmness and be able to relax. This project attempts to assess ten parks in the city of Kamloops by assigning a value to the parks and the ecosystem services the community enjoys. The picture below shows some of the beauty of our green spaces. Words to describe this beauty is unnecessary.

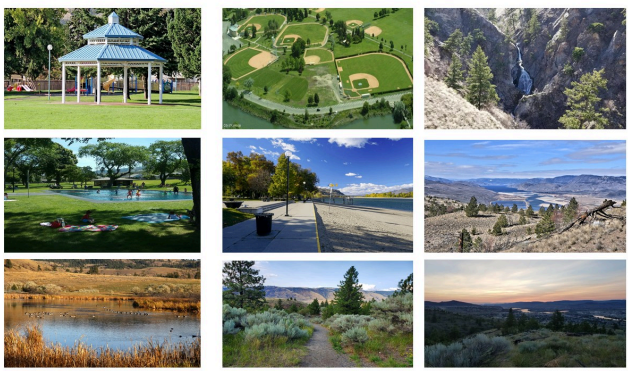

Figure 1: Selected Parks of Kamloops

The adventure of writing about these Kamloops Parks has come to an ending. The hope is to continue this project next year and place a value on more parks. The table below provides a summary of the findings of my graduate students starting

from smaller parks like Prince Charles to the largest Kenna Cartwright Nature Park. The value of these parks was estimated at 3.8 billion dollars with a yield of ecosystem services in the range of 2-5% per year or $133 million ecosystem services per year at a mid-range yield of 3.5%.

Table 1: Summary of the findings of the parks.

Parks	Ha	Value of Park (in mlns of $s)	Ecosystem services per year (in mlns of $s)	Social return per year
Prince Charles	1.3	8	0.2 - 0.4	2.1-5%
McDonald	3.1	13.1	0.4 - 0.7	3.2-5%
Albert McGowan	9.7	48	1.3 - 2.4	2.7-5%
Riverside	10.5	57.2	1.3 - 2.9	2.3-5%
Ross Hill	11	17	0.9 - 1.5	5-8.9%
McArthur Island	51	197	9.8	5%
Valleyview Nature	80.7	177.5	8.9 - 11.1	5-6.2%
Peterson Creek	94	306	12.8 - 15.3	4.2-5%
Kenna Cartwright	749	2,960	45.7 - 58.6	1.5 - 2% with future growth of 1.5 - 2%

This book covers only a fraction of the parks and green space and does not include the unique Kamloops River Trail nor the Lac du Bois protected Provincial Park which is on the northwest outskirts of the city with an estimated 15,717 hectares of land. Assessing this park at an average value of $3.9 million per hectare results in a value of $61.3 billion with ecosystem services in the range of $2.5 billion per year. Although it could be possible the value of these parks is

overestimated but this would only increase the social return or yield of the parks. A social rate of return in the range of 2-5%, as this study found, is significant and comparable to other returns of other financial (e.g. government bonds) or real assets (e.g. real estate).

Finally, I cannot thank enough all my graduate students for their dedication, work ethic, and engagement in this project. It would not be possible without their participation. Thank you!