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The Economic Impact of Non-Motorized Recreation in Alberta

Submitted to:

Outdoor Council of Canada

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Table of Contents

1.	Executive Summary.....	2
2.	Introduction.....	3
3.	Methodology and Data	4
3.1	Data Sources.....	5
3.2	Input-Output Model.....	6
4.	Results.....	7
4.1	Expenditures.....	7
4.1.1	Single-day Activity Expenditures	7
4.1.2	Multi-day Activity Expenditures	8
4.1.3	Wildlife Viewing Expenditures	9
4.1.4	Equipment Expenditures	10
4.2	Economic Impacts	10
5.	References	12

List of Figures

Figure 4.1	Proportion of Single-day Activity Expenditures by Spending Category	8
Figure 4.2	Proportion of Multi-day Activity Expenditures by Spending Category	9

List of Tables

Table 4.1	Single-day Activity Expenditures and Frequency, by Activity, per Person	7
Table 4.2	Multi-day Activity Expenditures and Frequency, by Activity, per Person	8
Table 4.3	Economic Impacts from Non-Motorized Recreation in Alberta ..	11

Appendices

Appendix A:	Further Information for IO Analysis	13
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1. Executive Summary

The Outdoor Council of Canada, with the financial support of other like-minded organizations, engaged Nichols Applied Management Inc. to estimate the current contribution of non-motorized outdoor recreation (e.g. hiking, camping, biking, etc.) to the Alberta economy.

The approach taken in this study was to:

- Identify the expenditures made on non-motorized outdoor recreation activities in Alberta;
- Estimate the frequency of and propensity to participate in non-motorized outdoor recreation activities (and thus spending) in the general population;
- Estimate how spending on non-motorized recreation circulates throughout the general economy.

The non-motorized recreation activities evaluated in this study include:

- Hiking
- Trail running
- Climbing (including outdoor rock climbing, scrambling, mountaineering, and ice climbing)
- Fishing, hunting, and horseback riding
- Biking (including trail biking and unassisted downhill mountain biking)
- Water activities (including flat-water kayaking/canoeing and white-water kayaking/canoeing)
- Winter activities (including cross-country skiing, snowshoeing, out-of-bounds skiing/snowboarding, and backcountry skiing/snowboarding).
- Camping
- Wildlife viewing (including photographing nature and birding)

Expenditures were estimated for both single- and multi-day activities, as well as the purchase of equipment. Albertans spend an average of \$33.46 per day on single-day activities, primarily on expenditures related to transportation, food and beverage, and entertainment. Multi-day activities are more expensive, with spending around \$137.75 per person per day, the additional amount attributable primarily to accommodations, food and beverages, and transportation. Though multi-day activities are costlier, single-day activities are undertaken much more frequently. Annual spending on single-day activities per person per year is approximately \$253.17, compared to \$168.04 for multi-day activities. A notable portion of non-motorized recreation spending in the province is on equipment; approximately \$1.7 billion is spent per year for both single- and multi-day activities.

Non-motorized recreation in Alberta results in approximately \$5.49 billion in GDP (1.7% of provincial GDP), including \$3.37 billion in labour income and the equivalent of 77,430 jobs. Provincial and federal income tax and GST that accrue from non-motorized recreation in Alberta are approximately \$685 million per year.

2. Introduction

The Outdoor Council of Canada (OCC) is a national non-profit organization seeking to encourage, promote, and facilitate safe outdoor education and recreation for all (Outdoor Council of Canada 2018a). The OCC was established as a nationally incorporated organization in 2008 out of the University of Calgary's Outdoor Centre in the wake of several fatal outdoor accidents that resulted in increasing barriers against providing Canadians, particularly children and youth, with low-risk education and activity programs in natural environments. The organization now operates in all Canadian Provinces and two territories. (Outdoor Council of Canada 2018b).

In an effort to foster outdoor recreation leaders in Canada, the OCC offers field leader training and certification through several outdoor, hands-on courses. In addition to its' field training opportunities, the OCC aims to achieve its mandate, in part, by advocating for outdoor recreation and education in Canada with the support of reliable, robust evidence (Outdoor Council of Canada 2018a). As such, the OCC, with the financial support of sector supporters, engaged Nichols Applied Management Inc. to estimate the current contribution of non-motorized outdoor recreation (e.g. hiking, camping, biking, etc.) to the Alberta economy.

The OCC wishes to thank the following organizations for their support in financing this report:

- Alberta Equine Federation
- Association of Canadian Mountain Guides
- Calgary Arts Academy
- Company of adventurers
- MITACS
- Mountain Equipment Coop
- Mount Royal University
- Nature Conservancy of Canada
- Norseman Outdoor Centre
- Ortovox Canada
- Prospect Human Services Society
- Strathcona-Tweedsmuir School
- The Calgary Foundation
- The Outdoor Centre at the University of Calgary
- YMCA (Calgary)

3. Methodology and Data

The generally accepted approach for delineating and articulating economic impacts (value) of spending on a particular activity (in this case, non-motorized recreation) is to first identify the expenditures associated with the activity in question and subsequently determine how these expenditures circulate throughout the broader economy in the form of purchases from suppliers and related industries as well as wages paid to and expenditures made by households.

The economic impacts generated from non-motorized recreation stem from expenditures associated with the activity itself (e.g. travelling to and from recreation amenities, food, accommodations, etc.) and the supplies or products necessary to undertake recreation activities (e.g. hiking boots, skis, etc.). In brief, the approach taken in this study was to:

- Identify the expenditures made on non-motorized outdoor recreation activities on a per-person-per-trip basis;
- Estimate the frequency of and propensity to participate in non-motorized outdoor recreation activities (and thus spending) in the general population;
- Calculate the annual expenditures related to non-motorized outdoor recreation and estimate how this spending circulates throughout the general economy.

The activities included in this study focus on non-motorized outdoor recreation activities; indoor activities, including organized sports, are excluded from the analysis. The following non-motorized activities analyzed in this study include:

- Hiking
- Trail running
- Climbing (including outdoor rock climbing, scrambling, mountaineering, and ice climbing)
- Fishing, hunting, and horseback riding
- Biking (including trail biking and unassisted downhill mountain biking)
- Water activities (including flat-water kayaking/canoeing and white-water kayaking/canoeing)
- Winter activities (including cross-country skiing, snowshoeing, out-of-bounds skiing/snowboarding, and backcountry skiing/snowboarding).
- Camping
- Wildlife viewing (including photographing nature and birding)

The definition of non-motorized outdoor recreation was confined to the above activities due to the limited availability of data and to allow for comparability across similar studies. The expenditure data for all activities (except camping and wildlife viewing) were sourced from a report published out of the School of Resource and Environmental Management at Simon Fraser University (Kux and Haider 2014).¹ As such, our activity definitions are in keeping with Kux and Haider (2014).

¹ Kux and Haider (2014) provide the best available data for non-motorized recreation expenditures in Western Canada. For this study, we believe it is reasonable to assume that the outdoor recreation spending and frequency by British Columbians would be highly similar in Alberta given that individuals in these provinces have similar income levels, outdoor recreation opportunities, and values for outdoor recreation.

For each of the above-listed activities, the expenditure categories associated with non-motorized recreation are as follows:

- Activity expenditures:
 - Transportation
 - Access fees
 - Accommodations
 - Food and beverage
 - Entertainment
 - Other
- Equipment expenditures:
 - Equipment purchases
 - Equipment rentals
 - Skill development expenditures

It is important to note that there are several challenges with equipment expenditure data. First, most outdoor recreation equipment would be considered durable goods in that they are goods that can be used for a long period of time and do not need to be purchased on a regular basis. For example, equipment for wildlife viewing may include a camera or binoculars; these are items that tend to last for a number of years and are therefore purchased infrequently. As such, consumer spending in the province on recreation equipment in a given year may not represent the average spending on these goods across a longer time period. Second, it is difficult to attribute spending on equipment to a specific activity within Alberta; many pieces of recreation equipment can be used for several activities (e.g. a backpack may be used for hiking, climbing, biking, etc.) and can be used for activities outside of Alberta as well.

3.1 Data Sources

The scope of this study is such that primary data collection with respect to recreation frequency and spending in the province was cost prohibitive. Accordingly, the study team has relied on published literature and government statistics to create a representative expenditure profile of non-motorized recreation in Alberta.

Data sources for the analysis of expenditures included:

- the Simon Fraser University report on non-motorized outdoor recreation in British Columbia (Kux and Haider 2014);
- the Canadian Parks Council report on the economic impact of Canada's parks for provincial and national park expenditures (CPC 2009);
- Alberta Parks (2018);
- Parks Canada (2017);
- the 2017 Alberta Culture and Tourism Recreation Survey for province-wide activity participation rates in Alberta;
- the 2012 Canadian Nature Survey (Federal, Provincial, and Territorial Governments of Canada 2014); and
- measures of inflation published by Statistics Canada (2018a).

The available data allowed for the delineation of spending patterns for specific activities for both single- and multi-day trips across various expenditure categories. The spending associated with individual expenditures on non-motorized outdoor recreation includes:

- transportation, including vehicle operation (i.e. fuel), vehicle rentals, airfare, public transit, and parking expenses;
- access fees (i.e. use fees for activities in regulated areas);
- accommodations (multi-day trips only);
- food and beverage spending (groceries);
- entertainment (including restaurant spending); and
- other miscellaneous expenditures.

Note that statistically reliable wildlife viewing expenditure data was not available at a level of disaggregation below the annual provincial total.

3.2 Input-Output Model

Having identified a representative level of individual expenditures on non-motorized recreation in Alberta, the study team calculated the anticipated ripple effects of this expenditure throughout the broader economy using the Alberta Input-Output (IO) Model, which is built and maintained by Alberta Finance (Government of Alberta 2017). Conceptually, the IO model allows an analyst to quantify the economic impacts of a particular activity as the spending associated with the activity ripples through the economy due to the interconnected nature of various sectors and markets. The model aims to capture the interdependencies between industries by linking forward (sales) and backward (purchases) transactions across industries and with the final demand sector.

Specifically, an IO model considers the:

- **Direct impact** of expenditures on recreation-related goods and services;
- **Indirect impact** of expenditures as suppliers to recreation-related goods and services expand their output to meet the needs of the direct industry; and
- **Induced impact** of spending as the additional income paid to employees of the direct and indirect sectors is circulated through the economy.

Together, the direct, indirect, and induced impacts constitute the full economic impact of a project or activity at a provincial level expressed in terms of three widely accepted metrics of economic activity, namely:

- **Gross Domestic Product (GDP)** – the measure of gross value added in an economy, this metric is often used to describe the size of growth of an economy.
- **Labour income** – a measure of the returns to labour paid as either wages or salaries and a major component of GDP.
- **Employment** – the number of full-time equivalent (FTE) jobs. One FTE is the equivalent of one person working full time for one year. For example, two half-time jobs would be measured as a single FTE.

4. Results

4.1 Expenditures

A summary of estimated average single-day, multi-day, and equipment expenditures are provided below. Due to data limitations, wildlife viewing statistics could not be expressed on a per-person-per day basis and are instead expressed annually.

4.1.1 Single-day Activity Expenditures

Table 4.1 Single-day Activity Expenditures and Frequency, by Activity, per Person

Activity	Spending per day	Spending per year	Days per year	Participation rate
Hiking	\$37.51	\$483.88	12.90	46%
Trail running	\$24.25	\$332.17	13.70	30%
Climbing	\$42.92	\$170.61	3.98	4%
Fishing, hunting, and horseback riding	\$44.77	\$276.11	6.17	23%
Biking activities	\$18.67	\$145.66	7.80	51%
Water activities	\$26.65	\$125.24	4.70	17%
Winter activities	\$39.43	\$238.54	6.05	43%
Average	\$33.46	\$253.17	7.90	31%

Source: Kux and Haider (2014); Alberta Culture and Tourism (2017); Statistics Canada (2018a)

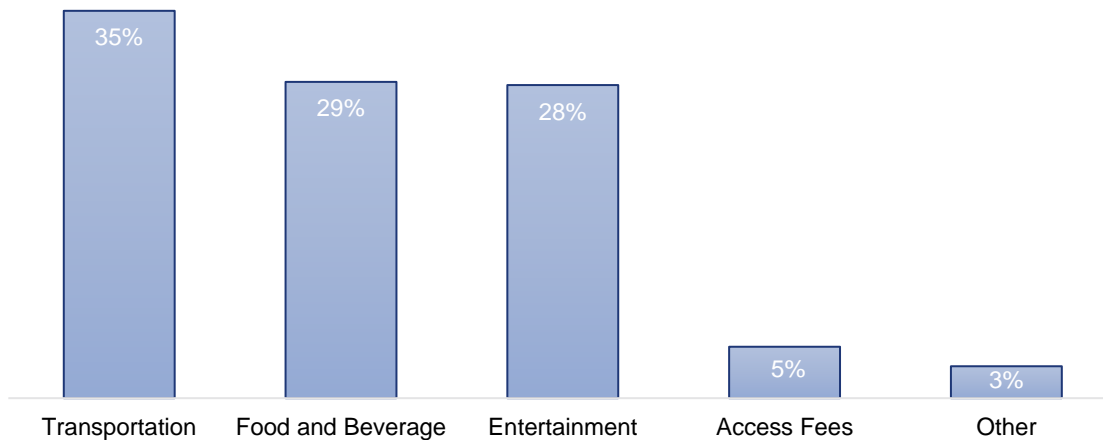
Biking is the most popular single-day activity, with more than half of Albertans participating during the year. Hiking and winter activities are the next most popular activities in Alberta, with 46% and 43% participation in each respectively, while trail running is undertaken by about one third of Albertans. Water activities are less popular with a participation rate of approximately 17%, and single-day climbing is the least sought out activity with only 4% of Albertans partaking each year.

In terms of activity frequency, hiking and trail running are the most frequently engaged in activities with individuals participating in each over 10 days per year. All other activity frequencies range between about 4 to 8 days per person per year.

Biking activities are the least expensive on a per day basis, costing less than \$20 per day. Fishing, hunting, and horseback riding are the most expensive of all single-day activities, costing approximately \$44.77. Climbing is a similarly expensive activity at \$42.92 per day. Hiking, trail running, water activities, and winter activities range from \$24.25 to \$39.43 per day.



Figure 4.1 Proportion of Single-day Activity Expenditures by Spending Category



Note: based on per year, per person expenditures

Source: Kux and Haider (2014); Alberta Culture and Tourism (2017); Statistics Canada (2018a)

Across all single-day activities, transportation expenditures (i.e. costs of fuel, parking, vehicle rentals, etc.) comprise the largest share of individual spending at 35%. Expenditures on food and beverage, as well as entertainment, make up 29% and 28% of individual spending respectively, while access fees and other miscellaneous expenses are negligible.

4.1.2 Multi-day Activity Expenditures

Table 4.2 Multi-day Activity Expenditures and Frequency, by Activity, per Person

Activity	Spending per day	Spending per year	Days per year ²	Participation rate
Hiking	\$97.84	\$117.41	1.20	4%
Trail running	\$176.08	\$140.86	0.80	2%
Climbing	\$216.62	\$157.05	0.73	1%
Fishing, hunting, and horseback riding	\$120.16	\$180.24	1.50	6%
Biking activities	\$116.02	\$69.61	0.60	4%
Water activities	\$91.43	\$88.39	0.97	3%
Winter activities	\$146.08	\$127.82	0.88	6%
Camping	n.a.	\$462.92	n.a.	n.a.
Average	\$137.75	\$168.04	6.67	4%

Note: Per day visitation frequency for those camping in Alberta's provincial and national parks is not available. Non-motorized camping expenditures were estimated based on the number of non-powered camping sites in Alberta's provincial and national parks, and assuming a lower overall transportation cost (to eliminate higher costs of transporting RVs and other motorized camping vehicles).

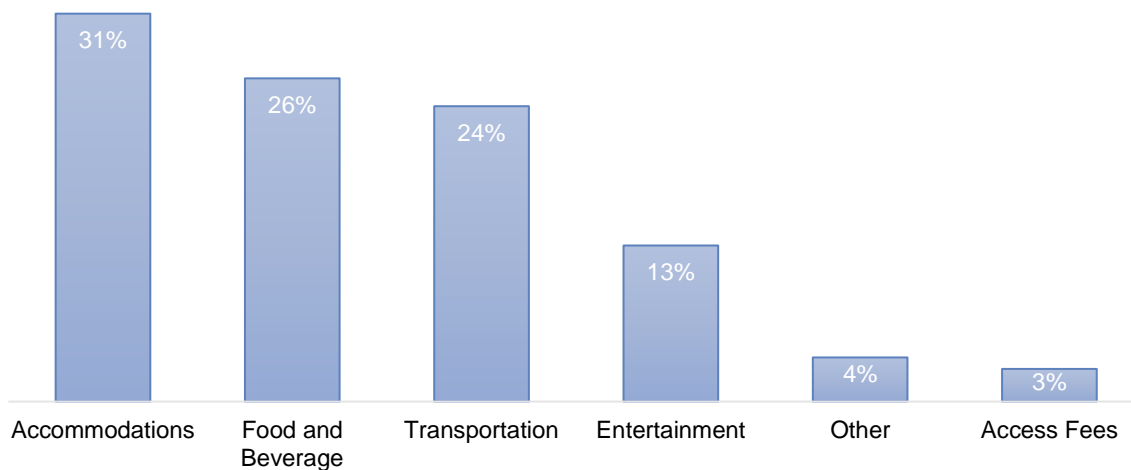
Source: Kux and Haider (2014); Alberta Culture and Tourism (2017); Statistics Canada (2018a); CPC (2009); Alberta Parks (2018); Parks Canada (2017)

² The average multi-day trips per year are quite low relative to single-day trips (with many being less than one). This is because the average was taken over all respondents, including those who responded "0" for multi-day trips.

Participation in multi-day non-motorized recreation is much lower than single-day activities. Fishing, hunting, and horseback riding, as well as winter activities, are the most popular multi-day activities, with participation rates of 6% each. Approximately 4% of Albertans participate in multi-day hiking and biking activities. Multi-day water activities, trail running, and climbing have low participation rates of 3%, 2%, and 1%, respectively.

Of the multi-day activities, climbing is the most expensive with a daily cost of about \$216. Trail running, fishing, hunting, and horseback riding, biking activities, and winter activities range from about \$116 to \$176 per day, while multi-day hiking and water activities each cost less than \$100 per day.

Figure 4.2 Proportion of Multi-day Activity Expenditures by Spending Category



Note: based on per year, per person expenditures

Source: Kux and Haider (2014); Alberta Culture and Tourism (2017); Statistics Canada (2018a); CPC (2009); Alberta Parks (2018); Parks Canada (2017)

Unsurprisingly, accommodation expenditures comprise the largest share of individual spending on multi-day activities at 31%. Expenditures on food and beverage, as well as transportation, make up 26% and 24% of individual spending respectively, while entertainment makes up 13% of overall expenditures. Like single-day expenses, other miscellaneous expense, and access fees are less than 5% of total multi-day spending.

4.1.3 Wildlife Viewing Expenditures

According to the 2012 Canadian Nature Survey, approximately 46% of Albertans participate in wildlife viewing by photographing nature or birding. Total expenditures (excluding equipment expenditures) for wildlife viewing in Alberta are an estimated \$310 million per year.

It is important to note that Albertans may undertake wildlife viewing during other non-motorized recreation activities such as hiking or biking. Therefore, wildlife viewing expenditures may be double counted in other activity expenditures, resulting in potentially overestimated economic impacts.



4.1.4 Equipment Expenditures

Kux and Haider (2014) do not report equipment expenditures by activity, but rather report expenditures individuals made on all outdoor recreation activities. For the purposes of our analysis we use average equipment expenditures per individual per year for all outdoor recreation activities, along with the median participation rate in non-motorized recreation in Alberta, to estimate provincial equipment expenditures for all activities except for wildlife viewing (which are taken from the 2012 Canadian nature survey). Annual equipment expenditures on non-motorized recreation in Alberta are an estimated \$1.7 billion.

4.2 Economic Impacts

All sectors of the economy are interconnected in that they buy goods and services from each other. This interconnectedness was estimated and quantified using the IO model described in section 2.2. Accordingly, the spending by Albertans on non-motorized outdoor recreation activities generated subsequent indirect and induced economic impacts as it rippled throughout the economy.

In total, expenditures on non-motorized outdoor recreation by Albertans supported an estimated \$5.49 billion in provincial GDP, representing approximately 1.7% of the province's total GDP of \$315 billion (Statistics Canada 2017). The largest component of GDP is returns to labour – or more plainly, the wages and salaries paid to people. Of the \$5.49 billion in GDP, approximately \$3.37 billion accrued to workers, which translates to the equivalent of 77,430 jobs³ (Table 4.3), or approximately 3.4% of the province's employed labour force of 2.3 million (Statistics Canada 2018b).

Almost one-third of the economic impacts from spending on non-motorized outdoor recreation in Alberta are a result of spending on equipment. As described above, it is important to note the caveats associated with equipment expenditure data in that they are typically durable goods that cannot easily be specifically attributed to outdoor activities within Alberta.

Between single- and multi-day trips, single-day trips contribute more to the economic spinoff than multi-day. Of the non-motorized activities themselves, hiking and camping (two of the more popular activities) have the largest impacts, while climbing (one of the less popular activities) has the smallest.

The GDP and labour income resulting from non-motorized recreation in Alberta have tax implications as well, namely federal and provincial income taxes and GST.⁴ The income taxes collected from non-motorized recreation activities in the province are estimated to be approximately \$605 million per year (Statistics Canada 2018c). The GST collected from these activities is an estimated \$80 million per year. Due to the complexities associated with corporate tax calculations (i.e. corporate structure, cross-jurisdictional considerations, etc.), no estimate of corporate taxes is available.

It is important to note that the presence of recreational opportunities, such as those described in this study, play a non-monetary role in supporting the provincial economy. Alberta offers several unique and remarkable recreation amenities that attract people from around the world. To the extent that the presence of these opportunities improves employee attraction and retention, other sectors of the economy may have a nominal advantage as compared to those operating in less attractive areas of the country.

³ Note, the estimated 77,430 jobs are full-time equivalents (i.e. one person working full time for one year). If the jobs in this sector are both full-time and part-time, this number may be higher.

⁴ Note, there are no municipal property taxes that can be traced to non-motorized recreation activities.

Table 4.3 Economic Impacts from Non-Motorized Recreation in Alberta

Economic Impact	Hiking	Trail Running	Climbing	Consumptive + Horseback Riding	Biking Activities	Water Activities	Winter Activities	Camping	Wildlife Viewing	Equipment	Total
GDP (\$ millions)											
Direct/Indirect	735	345	30	240	250	80	360	565	255	1,480	4,335
Induced	200	90	5	65	70	20	100	150	65	375	1,150
Total	935	440	35	305	315	100	460	720	320	1,855	5,485
Labour income (\$ millions)											
Direct/Indirect	500	235	20	165	170	55	245	385	170	975	2,915
Induced	80	35	5	25	25	10	40	60	25	150	455
Total	580	270	20	190	195	60	285	445	200	1,120	3,370
Employment (FTE)											
Direct/Indirect	12,420	5,230	425	4,080	4,335	1,260	5,845	9,780	3,955	21,155	68,485
Induced	1,565	720	60	510	535	165	760	1,190	520	2,925	8,945
Total	13,985	5,945	485	4,590	4,870	1,425	6,605	10,970	4,475	24,080	77,430

5. References

- Alberta Culture and Tourism. 2017. "2017 Albertan Recreation Survey." Accessed February 16, 2018 at <https://open.alberta.ca/dataset/58b1254f-9842-4abf-8bb5-86ecb940245e/resource/077024f6-9900-4c70-a101-d0c1c099b0c3/download/recreation-survey-2017.pdf>
- Alberta Parks. 2018. "Camping." Accessed February 16, 2018 at <https://www.albertaparks.ca/albertaparksca/visit-our-parks/camping/>
- Canadian Parks Council (CPC). 2009. "The Economic Impact of Canada's National, Provincial and Territorial Parks in 2009." Accessed February 16, 2018 at http://www.parks-parcs.ca/english/pdf/econ_impact_2009_part1.pdf
- Federal, Provincial, and Territorial Governments of Canada. 2014. "2012 Canadian Nature Survey: Awareness, participation, and expenditures in nature-based recreation, conservation, and subsistence." Accessed March 12, 2018 at http://www.biodivcanada.ca/2A0569A9-77BE-4E16-B2A4-C0A64C2B9843/2012_Canadian_Nature_Survey_Report%28accessible_opt%29.pdf
- Government of Alberta. 2017. "Alberta Economic Multipliers 2013." Accessed February 6, 2018 at <https://open.alberta.ca/dataset/47490b9d-5805-4be3-8174-068d72ec9101/resource/d118ada7-d99c-4ede-bd36-8a1df7f05d9b/download/Alberta-Economic-Multipliers-2013.pdf>
- Kux, S. and W. Haider. 2014. "Non-Motorized Outdoor Recreation in British Columbia in 2012: Participation and Economic Contributions." School of Resource and Environmental Management, Simon Fraser University. Accessed February 16, 2018 at https://mountainclubs.org/wp-content/uploads/2014/04/SFU_FMCBC_Recreation_Report_2014.pdf
- Outdoor Council of Canada. 2018a. "About Us." Accessed February 27, 2018 at <https://www.outdoorcouncil.ca/About>.
- Outdoor Council of Canada. 2018b. "Our History." Accessed February 27, 2018 at <https://www.outdoorcouncil.ca/OCC-History>.
- Parks Canada. 2018. "National Parks." Accessed February 16, 2018 at <https://www.pc.gc.ca/en/pn-np>.
- Statistics Canada. 2017. *Gross domestic product, expenditure-based, by province and territory*. Accessed February 27, 2018 at <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/econ15-eng.htm>.
- Statistics Canada. 2018a. *Table 326-0021 – Consumer Price Index, annual (2002=100), all items, Canada*. Accessed February 16, 2018 at <http://www5.statcan.gc.ca/cansim/a26?id=3260021>.
- Statistics Canada. 2018b. *Employment by age, sex, type of work, class of worker and province (monthly) (Alberta)*. Accessed February 27, 2018 at: <https://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/labr66j-eng.htm>.
- Statistics Canada. 2018c. *Market income, government transfers, total income, income tax and after-tax income, by economic family type (Alberta)*. Accessed March 12, 2018 at: <http://www5.statcan.gc.ca/cansim/a47#F4>

Appendix A: Further Information for IO Analysis

The Input-Output (IO) model built and maintained by Alberta Finance is designed to measure the economic impact of a particular activity on a provincial level. The model relies on detailed data collected over several years by Statistics Canada to approximate the structure of, and relationships between, various sectors of the economy, including households. These relationships allow an analyst to estimate the effect of spending on a particular good across the economy as suppliers expand output and wages are paid to and spent by employees.

The economy is a highly complicated and dynamic system that is constantly changing as economic actors respond to a litany of signals across a number of markets over a series of time periods. The IO model provides a snapshot of the economy and the aforementioned relationships at a point in time that, when coupled with a number of simplifying assumptions, allows for estimates of economic impacts to be made based on a simplified macroeconomic structure. This simplified representation of the economy necessarily imposes limitations on the model. They include:

- The model does not consider the availability or current use of resources necessary to build a given project. In reality, investment in a particular project may divert resources away from other uses and therefore result in the displacement of other economic activity. The estimates derived from the IO model should therefore not be interpreted as entirely net to the economy.
- Estimates of indirect and induced impacts are not sensitive to scale. The production relationships in the IO model are static and therefore do not reflect possible economies of scale as producers increase output to meet the additional demand resulting from the activity being analyzed. This may result in the overestimation of impacts.
- The output of a given industry is assumed to be homogenous across all producers. For example, the pulp and paper industry is assumed to produce a single product using a single representative production function. Differences across specific products and producers within a broader industry are not reflected in the model.

Although the IO model has limitations, it is the most detailed representation of the provincial economy available and its use is encouraged by a number of government and regulatory agencies. The estimates produced by the model should be considered directionally correct rather than scientifically precise.

The IO model industries used in this analysis include:

- Accommodation and food services;
- Arts, entertainment and recreation;
- Transit, ground passenger and scenic and sightseeing transportation, taxi and limousine service and support activities for transportation; and
- Retail trade.



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