
The Impact of COVID-19 on Outdoor Recreation Participation in Canada

Initial Report on a National Study of Outdoor Recreationists

Dr. Timothy S. O'Connell¹
Dr. Ryan A. Howard²
Dr. Garrett Hutson¹

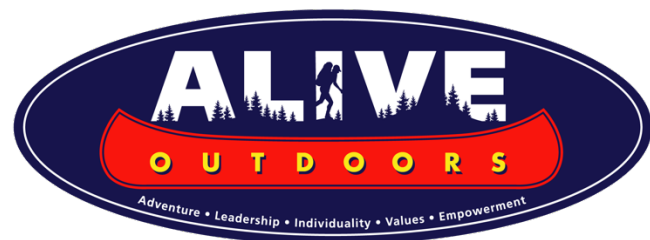
¹Department of Recreation and Leisure Studies, Brock University

²ALIVE Outdoors

Corresponding authors: tim.oconnell@brocku.ca and ryanhoward@aliveoutdoors.com

Around March 17, 2020, most provinces and territories in Canada implemented stay-at-home, physical distancing strategies in response to the COVID-19 pandemic. This immediately impacted the way Canadians were able to engage in recreation and leisure activities. Initially, countless outdoor recreation and natural resource areas remained open for use. However, as many people viewed these areas as safe places for recreation activities, they were quickly closed due to overcrowding and lack of adherence to physical distancing guidelines. In an attempt to gain insight into Canadians' outdoor recreation practices before, during and after the start of COVID-19, researchers from the Department of Recreation and Leisure Studies at Brock University and ALIVE Outdoors collaborated to collect data for an 8-day period from May 7 - May 15, 2020. A total of 1550 people submitted surveys during this time. We hope results of this study will illuminate the impacts of COVID-19 on Canadian outdoor recreationists and provide information to land managers, politicians, and recreationists that is helpful in making decisions as we move through this pandemic.

This report contains brief descriptions of key aspects of the data. A more detailed report is forthcoming.



Participant Demographics

Response Rate

A “snowball” sampling approach was used to recruit participants. Researchers posted invitations on various social media sites, emailed individuals in their professional and personal networks, posted survey information on organizational websites, and were interviewed by media outlets. Network associates were asked to share with their networks, etc. Overall, 2,260 people started the survey between Thursday, May 7 and Friday, May 15, 2020. 1550 individuals submitted the survey for a completion rate of 68.5%. Note that not all respondents answered every question.

Demographics

Gender:

Female: 66.3%
Male: 32.5%
Transgender: 0.1%
Non-binary: 0.4%
Other: 0.1%
Prefer not to say: 0.6%

Age:

Average: 42 years old

Ethnicity:

First Nation: 0.2%
Métis: 0.7%
Hispanic or Latina/Latino/Latinx:
0.5%
Asian or Pacific Islander: 2.7%
Black: 0.2%
Arab: 0.1%
White: 91.8%
Other: 1.9%
Prefer not to say: 2.0%

Residency:

Canadian Resident: 98.8%
Non-Canadian Resident: 1.2%

Province of Residency:

Alberta: 4.7%
British Columbia: 10.9%
Manitoba: 0.5%
New Brunswick: 1.2%
Newfoundland & Labrador: 0.3%
Northwest Territories: 0.3%
Nova Scotia: 6.2%
Nunavut: 0.1%
Ontario: 70.2%
Prince Edward Island: 0.1%
Quebec: 4.0%
Saskatchewan: 0.8%
Yukon: 0.4%
Live Outside Canada: 0.3%

Size of Municipality:

0 - 9,999: 15.3%
10,000 - 49,999: 19.6%
50,000 - 99,999: 10.4%
100,000 - Larger: 54.6%

Residential Setting:

Rural: 27.6%
Suburban: 31.7%
Urban: 40.7%

Recreation Specialization

Specialization Scales

My principal outdoor recreation activity...	Mean*	Standard Deviation
Says a lot about who I am. ¹	4.22	0.85
Lets me really be myself. ¹	4.42	0.81
Enables others to see me the way I want them to see me. ¹	3.95	0.95
Is very important to me. ²	4.74	0.60
Is one of the most satisfying things I do. ²	4.62	0.71
Is one of the most enjoyable things I do. ²	4.69	0.64
Is of interest to me. ²	4.79	0.55
Is pleasurable. ²	4.78	0.56
Plays a central role in my life. ³	4.41	0.82
Gives me something to organize my life around. ³	4.10	0.96
Has grown more significant in my life. ³	4.32	0.90

*Scale: 1= Strongly Disagree, 2=Disagree, 3=Neither Disagree or Agree, 4=Agree, 5=Strongly Agree

¹Measure of Identity

²Measure of Attraction

³Measure of Centrality

Skill Level

For your principal outdoor recreation activity, please select your level of skill*:	N	Percent
Beginner	25	1.6
Advanced Beginner/Novice	128	8.4
Intermediate	596	39.0
Advanced	567	37.1
Expert	151	9.9
Post-expert (not the expert I used to be)	60	3.9

* Scale: 1=Beginner, 2=Advanced Beginner/Novice, 3=Intermediate, 4=Advanced, 5=Expert, 6=Post-expert (not the expert I used to be)

*Mean = 3.57

*Standard Deviation = 0.97

Reliability of Specialization Scales

	Mean	Cronbach's Alpha
Identity	12.60*	0.84***
Attraction	23.65*	0.81***
Centrality	12.84*	0.84***
Skill level	3.57**	0.97***

*Scale: 1= Strongly Disagree, 2=Disagree, 3=Neither Disagree or Agree, 4=Agree, 5=Strongly Agree

**Scale: 1=Beginner, 2=Advanced Beginner/Novice, 3=Intermediate, 4=Advanced, 5=Expert, 6=Post-expert (not the expert I used to be)

***Satisfactory reliability (Vaske, Beaman & Sponarski, 2017)

k-means Cluster Analysis for Specialization

	Final cluster center for Non-Specialized	Final cluster center for Non-specialized
Identity*	-1.19	0.33
Attraction*	-1.21	0.33
Centrality*	-1.30	0.36
Skill level*	-0.61	0.17

*Statistically significant difference between groups at $p \leq .001$

Note: Z scores were used for these analyses

Scales used to measure recreation specialization were adapted from Jun et al. (2015) and Rice et al. (2020). Sub-scale scores for Identity, Attraction and Centrality were calculated as well as Skill Level. Reliability analyses indicate that scale items consistently reflect the related construct. Results indicate there was a non-specialized and specialized group with a majority of participants being of intermediate (39%) or advanced (37%) skill level.

Motivation to Participate in Outdoor Recreation Activities

Motivation Scales

I participate in outdoor recreation to...	Mean*	Standard Deviation
Get exercise ¹	4.39	0.69
Be with family/friends ²	3.91	0.96
Get away from the usual demands of everyday life ³	4.36	0.77
Keep physically fit ¹	4.41	0.68
Be close to nature ⁴	4.66	0.62
Observe the scenic beauty ⁴	4.52	0.67
Experience excitement/adventure ¹	4.23	0.87
Enjoy the sounds/smells of nature ⁴	4.48	0.70
Be with people who enjoy the same things ²	4.03	0.94
Develop my skills/abilities ¹	4.07	0.89
Gain a sense of accomplishment ¹	4.20	0.82
Develop a sense of self-confidence ¹	4.05	0.89
Experience solitude ³	3.97	1.02
Be with people who share my values ²	3.86	0.95
Because it is cool to do so ²	2.82	1.19
Talk to new/varied people ²	3.09	1.11

*Scale: 1= Strongly Disagree, 2=Disagree, 3=Neither Disagree or Agree, 4=Agree, 5=Strongly Agree

¹Measure of Achievement

²Measure of Socialization

³Measure of Escape

⁴Measure of Enjoying Nature

Reliability of Motivation Scales

	Mean	Cronbach's Alpha
Achievement	25.35*	0.78**
Socialization	17.70*	0.79**
Escape	8.33*	0.83**
Enjoying Nature	13.66*	0.86**

*Scale: 1= Strongly Disagree, 2=Disagree, 3=Neither Disagree or Agree, 4=Agree, 5=Strongly Agree

**Satisfactory reliability (Vaske, Beaman & Sponarski, 2017)

k-means Cluster Analysis for Motivation

	Final cluster center for Achievers	Final cluster center for Socializers	Final cluster center for Nature Lovers	Final cluster center for Amotivated Recreationists
Achievement*	0.72	-0.25	-0.70	-1.78
Socialization*	0.67	0.06	-1.03	-1.19
Escape*	0.53	-0.82	0.27	-2.11
Enjoying Nature*	0.56	-0.77	0.24	-3.02

*Statistically significant difference between groups at $p \leq .001$

Note: Z scores were used for these analyses

Motivation scales were adapted from White (2008) to determine reasons why participants engage in outdoor recreation activities. Results indicate that respondents were primarily motivated by Achievement (42%), Socialization (29%) and Escape (27%) from everyday life. Amotivated Recreationists accounted for 3% of the sample in this study. These items proved reliable and a cluster analysis revealed four significantly different clusters.

Participation in Outdoor Recreation Activities

Outdoor Recreation Activities

	Frequency as Principal Activity ¹	Frequency ²	Mean Change in Participation Level ³	Standard Deviation
Backpacking	30	110	-68.01	53.68
Being at the beach	11	151	-43.51	62.57
Bird watching/wildlife viewing	17	308	45.29	39.96
Boating/sailing	7	36	-31.38	65.88
Campfires	6	182	-29.53	67.94
Camping (Developed/Campground)	17	120	-80.51	35.95
Camping (RV/Motorhome)	9	19	-87.78	45.86
Camping (Wilderness/Primitive)	85	275	-70.00	47.74
Canoeing (Flatwater)	56	153	-48.86	61.31
Canoeing (Whitewater)	39	58	-71.50	40.49
Caving	1	3	-1.00	42.93
Dog sledding	2	6	-3.50	83.39
Downhill skiing	40	132	-74.75	43.16
Downhill snowboarding	14	35	-70.60	53.87
Driving off-road vehicles/ATVs	2	19	-19.68	78.91
Fishing	8	50	-17.00	74.60
Gardening	12	478	54.01	33.77
Geocaching	12	30	10.06	73.15
Golf	6	45	-69.93	49.71
Hammocking	4	39	53.71	34.26
Harvesting/collecting wild plants	1	43	37.88	62.66
Hiking	255	625	-15.62	67.94

	Frequency as Principal Activity ¹	Frequency ²	Mean Change in Participation Level ³	Standard Deviation
Outdoor hockey	4	32	-83.53	25.08
Horseback riding	11	21	-58.76	57.68
Hunting/trapping	5	10	12.70	73.52
Ice skating (outdoors)	0	9	-63.11	53.21
Kite activities (kite skiing/boarding)	3	3	35.66	111.42
Lawn games	8	45	27.35	55.38
Motorized boating	0	3	-11.00	77.54
Mountain biking/E-biking on trails	85	180	1.20	70.29
Mountaineering	5	11	-88.54	18.60
Nature photography	5	86	18.16	59.53
Orienteering	0	1	-100.00	NA
Paddle boarding	17	41	-26.04	74.24
Participating in outdoor education programs	16	89	-82.43	36.76
Picnicking	1	40	-29.70	68.31
Recreating with pets	4	177	45.15	40.76
River kayaking	22	46	-29.58	69.18
River rafting/floating	4	4	-98.75	2.50
Road cycling	61	277	29.35	58.40
Rock climbing (all types)	126	140	-79.72	49.71
Rowing	12	18	-83.22	50.37
Running/jogging (outdoors)	121	353	52.66	45.24
Scuba diving/snorkeling	0	5	-54.60	87.21
Sea kayaking	39	44	-43.40	67.83
Shooting/archery	4	7	-30.14	80.28
Skateboarding/Inline skating/Scootering	1	17	32.17	72.46
Snowmobiling	1	7	-15.28	89.51
Snowshoeing	0	13	-33.76	83.01
Surfing	7	13	-42.30	77.32
Swimming (outdoor)	4	20	-74.65	46.51
Visiting outdoor historic sites	2	43	-61.25	54.87
Walking (outdoors)	116	737	51.09	44.92
X-country skiing	26	43	-48.23	57.78
Other	57	70	-25.24	79.40

¹Which of the following activities is your principal activity (the one you identify with most)?

²Select up to 3 activities you have increased and decreased participating in the most since COVID-19.

³Percentage increase or decrease with range of -100% to +100%.

^Note: Does not account for differences in climate or change in season.

Respondents reported the greatest decrease in camping (RV/motorhome and developed campgrounds), outdoor hockey, engaging in outdoor education programs, and downhill skiing. They reported the greatest increase in gardening, hammocking, running/jogging and walking outdoors and bird watching/wildlife viewing.

Reasons for Decreased Change in Select Outdoor Recreation Activities

	Honour	Expose Ill	Caring	Risk	Closed	Open	Obligations	Economic	Transport	Friends/Family	Alone	Respect	
Backpacking	4.21	3.60	1.35	1.39	3.57	4.38	2.18	2.04	2.66	1.95	2.60	3.82	3.62
Being at the beach	4.31	3.90	1.28	1.26	2.94	4.33	2.38	2.50	2.41	1.76	2.59	3.95	3.23
Boating/sailing	4.62	3.91	1.19	1.45	2.83	4.36	2.36	2.32	2.21	1.81	2.53	3.78	3.39
Campfires	4.27	3.84	1.27	1.31	2.90	3.92	2.62	2.32	2.45	1.79	2.65	3.90	3.31
Camping (Dev./Campground)	4.32	3.72	1.26	1.32	3.17	4.29	2.46	2.47	2.52	1.73	2.47	3.64	3.37
Camping (RV/Motorhome)	3.97	3.50	1.29	1.37	2.42	4.29	1.97	1.91	2.57	1.49	2.54	3.94	2.97
Camping (Wilderness/Primitive)	4.30	3.65	1.33	1.38	3.44	4.41	2.09	2.13	2.63	1.89	2.70	3.51	3.66
Canoeing (Flatwater)	4.34	3.73	1.30	1.38	3.27	4.37	2.04	2.28	2.58	1.83	2.47	3.87	3.64
Canoeing (Whitewater)	4.35	3.73	1.48	1.43	3.73	4.28	2.37	2.39	3.07	2.04	2.85	3.07	3.80
Downhill skiing	4.21	3.60	1.37	1.35	3.31	4.22	2.23	2.17	2.50	1.72	2.59	3.51	3.36
Downhill snowboarding	4.12	3.48	1.35	1.37	3.65	4.46	2.02	2.69	2.65	1.67	2.85	3.40	3.40
Driving off-road vehicles/ATVs	3.83	3.67	1.42	1.92	3.17	4.00	2.42	1.75	2.42	1.67	2.92	3.67	3.58
Fishing	3.68	1.34	1.51	3.05	4.16	2.53	2.34	2.55	1.95	2.84	4.08	3.50	3.68
Golf	4.17	3.80	1.29	1.41	2.47	4.11	2.33	2.14	2.14	1.63	2.32	3.80	2.76
Hiking	4.41	3.75	1.37	1.34	3.13	4.45	2.00	2.18	2.29	1.73	2.51	3.75	3.32
Outdoor hockey	4.14	3.66	1.26	1.36	2.59	3.90	2.51	2.43	2.29	1.77	2.23	3.62	3.00
Horseback riding	4.22	3.65	1.30	1.26	3.43	4.61	1.78	2.09	2.09	1.57	1.83	3.96	2.96
Paddle boarding	4.32	3.88	1.35	1.24	3.29	4.21	2.06	2.41	2.97	1.56	2.79	3.94	3.24
Outdoor education programs	4.44	4.02	1.33	1.36	3.26	4.36	2.40	2.45	2.93	1.89	2.60	3.56	3.54
Picnicking	4.29	3.95	1.11	1.16	3.05	3.89	3.05	2.39	2.68	2.11	3.18	3.89	2.84
River kayaking	4.36	4.00	1.31	1.26	3.90	4.29	2.29	1.67	2.26	1.50	3.12	2.81	3.67
Rock climbing (all types)	4.42	3.64	1.37	1.26	3.73	4.57	1.85	1.80	2.44	1.80	2.84	2.87	3.61
Rowing	4.29	3.52	1.38	1.57	2.29	4.62	1.95	1.95	1.90	1.67	2.19	3.81	2.95
Sea kayaking	4.52	4.09	1.27	1.32	3.50	4.43	2.02	1.95	2.63	1.79	2.68	3.91	3.41
Swimming (outdoors)	4.29	4.03	1.33	1.17	2.84	4.29	2.42	2.73	2.97	2.23	3.03	4.03	3.06
Visiting outdoor historic sites	4.33	3.91	1.17	1.39	3.07	3.91	2.48	2.49	2.12	1.84	2.35	4.17	2.95
X-country skiing	4.09	3.58	1.30	1.37	3.33	4.37	2.44	2.25	2.25	1.67	2.32	3.79	3.28
All Activities	4.22	3.72	1.34	1.34	3.11	4.14	2.35	2.20	2.43	1.80	2.53	3.72	3.29

*Scale: 1= Strongly Disagree, 2=Disagree, 3=Neither Disagree or Agree, 4=Agree, 5=Strongly Agree

^Only activities with decreased participation indicated by 18 people or more are included in this table.

See page 10 for sub-scale information.

Adapted from Rice et al. (2020).

Reasons for Increased Change in Select Outdoor Recreation Activities

	Honour	Expose Ill	Caring	Risk	Closed	Open	Obligations	Economic	Transport	Friends/Family	Alone	Respect	
Bird watching/wildlife viewing	4.33	3.91	1.41	1.38	3.14	4.16	2.39	2.44	2.52	1.86	2.60	3.84	3.35
Gardening	4.33	3.87	1.32	1.35	3.10	4.18	2.43	2.45	2.48	1.69	2.60	3.86	3.32
Geocaching	4.16	3.21	1.53	1.53	3.05	3.89	2.53	3.05	2.68	1.74	2.53	3.53	3.05
Hammocking	4.62	4.44	1.28	1.54	3.31	4.23	2.44	2.62	3.11	2.13	2.69	3.54	3.69
Harvesting/collecting wild plants	4.31	3.66	1.44	1.31	3.18	4.14	2.00	2.29	2.47	1.63	2.26	3.46	3.77
Hunting/trapping	3.83	3.67	1.83	1.33	2.83	3.00	3.50	2.00	2.83	2.17	3.00	3.50	3.33
Kite activities (kite skiing/boarding)	5.00	4.00	1.00	1.00	5.00	5.00	1.00	5.00	2.00	1.00	1.00	1.00	5.00
Lawn games	4.11	3.67	1.28	1.39	2.81	4.26	2.22	2.86	3.00	1.75	2.89	3.56	3.28
Nature photography	4.24	3.88	1.39	1.41	3.03	3.98	2.73	2.03	2.57	2.05	2.50	3.97	3.48
Recreating with pets	4.25	3.68	1.45	1.32	2.99	4.15	2.43	2.23	2.35	1.62	2.37	4.01	3.40
Road cycling	4.30	3.58	1.26	1.27	3.23	4.23	2.33	2.05	2.40	1.79	2.42	3.65	3.18
Running/jogging (outdoors)	4.20	3.58	1.32	1.33	3.19	4.14	2.47	2.18	2.44	1.81	2.58	3.61	3.29
Skateboarding/Inline skating/Scootering	4.36	4.18	1.55	1.36	3.36	4.36	2.36	2.45	3.27	2.64	2.36	3.82	3.45
Walking (outdoors)	4.25	3.76	1.31	1.31	3.08	4.19	2.39	2.18	2.36	1.71	2.50	3.76	3.22
All Activities	4.22	3.72	1.34	1.34	3.11	4.14	2.35	2.20	2.43	1.80	2.53	3.72	3.29

*Scale: 1= Strongly Disagree, 2=Disagree, 3=Neither Disagree or Agree, 4=Agree, 5=Strongly Agree

^Only activities with increased participation are included in this table.

See page 10 for sub-scale information.

Adapted from Rice et al. (2020).

Subscale information for Reasons for Decreased and Increased Change in Outdoor Recreation Activities:

Honour:	I wanted to honour physical distancing recommendations/policies.
Expose:	I did not want to expose myself to individuals who may be carrying COVID-19.
Ill:	I felt ill.
Caring:	I was caring for an ill individual.
Risk:	I did not want to risk injury that would require medical attention.
Closed:	The area(s) where I am able to participate in this activity was closed due to the COVID-19 pandemic.
Open:	The area(s) where I am able to participate in this activity has remained open during the COVID-19 pandemic.
Obligation:	Other obligations in my life (e.g., childcare, household responsibilities) now take up my recreation time.
Economic:	My economic situation has changed because of COVID-19.
Transport:	My access to transportation has changed because of COVID-19.
Family/Friends:	The family or friends with whom I recreated are no longer recreating and I don't want to/can't do it alone.
Alone:	It is an activity I can do alone.
Respect:	I wanted to respect the food supply and medical capacity of small communities

Respondents indicated that honouring physical distancing recommendations, area closures, activities could be done solo, and avoiding exposure to others who might be carrying COVID-19 as the most agreed to reasons why changes in activity occurred. Feeling ill, caring for an ill individual and changes to access to transportation were the least agreed to reasons for change.

Time Participating in Outdoor Recreation Activities

Hours Per Week Before, During and After COVID-19

Approximately how many hours per week did you participate in (or anticipate engaging in) your principal outdoor recreation activity...	Mean # of Hours*	Standard Deviation
Hours per week before March 17, 2020?	11.34	16.01
Hours per week since March 17, 2020?	5.06	33.95
Hours per week after COVID-19?	9.79	13.97

*Statistically significant difference between groups at $p \leq .001$

Differences in Change in Hours in Outdoor Recreation in Groups

		Mean Change	F-value
		in Hours	
Motivation:	Achievers	-9.83	3.18*
	Socializers	-3.27	
	Nature Lovers	-3.65	
	Amotivated Recreationists	-1.78	
Specialization:	Specialized	-7.10	3.06 ^{ns}
	Non-Specialized	-2.64	
Gender:	Female [^]	-4.39	4.58*
	Male [^]	-9.10	
Residential Setting:	Rural	-6.61	0.23 ^{ns}
	Suburban	-6.46	
	Urban	-5.13	

*Statistically significant at $p \leq .05$

^{ns}Not statistically significant.

[^]Cell size for other gender categories were too small for inclusion in this analysis.

Participants reported a significant decrease in the number of hours engaged in outdoor recreation since March 17, 2020. When able to return to “normal” outdoor recreation activities, they anticipate significantly less time than prior to the start of COVID-19. However, this is significantly greater than time spent participating in outdoor recreation activities during quarantine timeframes. One-way ANOVAs (and post hoc tests as necessary) were used to examine differences in groups. There were no significant differences in specialization or residential setting. Males reported having significantly less time than females. Achievers had significantly less time since the start of COVID-19 than other motivation groups.

Time Traveled to Participate in Outdoor Recreation

Time Traveled Before and After March 17, 2020*

How long does it take for you to get to the place where you participate in minutes your primary outdoor recreation activity most often? Length of time is considered in terms of “driving time” from your home to the place of outdoor recreation.		≤10	10 - 30	30 - 60	1 - 2	2 - 3	3 to 4	≥5
		minutes	minutes	minutes	hours	hours	hours	hours
Before COVID-19?	Frequency	519	379	304	167	88	41	17
	%	34.3	25.0	20.1	11.0	5.8	2.7	1.1
After COVID-19?	Frequency	677	343	222	115	63	34	18
	%	46.0	23.3	15.1	7.8	4.3	2.3	1.2

*Statistically significant at $p \leq .05$

Participants indicated significantly reducing the distance travelled to participate in outdoor recreation activities after the start of COVID-19. 10% more people were staying 30 minutes or less closer to home after March 17, 2020.

Change in Outdoor Recreation Location

Tell us how much you've changed your use of the following types of outdoor recreation areas since the beginning of COVID-19 in Canada (March 17, 2019)...	Mean Change in Participation Level* ¹	Std. Deviation
Private land or water	-10.15 ^{2,4}	54.43
Neighbourhood or city street	33.39 ⁴	51.78
City or town parks	-22.81 ⁴	60.99
Regional parks	-50.49 ²	53.46
School district property	-32.34 ⁴	51.35
Conservation areas	-45.82 ²	55.59
Undesignated natural areas (e.g., ravines)	-6.63	55.81
Provincial parks	-63.31 ^{2,3}	48.04
National parks	-53.01 ^{2,3}	50.62
Wilderness areas	-31.22 ^{2,3, 4}	59.29
Outdoor education centers	-40.31 ^{2,3}	49.64
Boat ramps	-28.91 ⁴	46.85
Private cottage or camp	-24.69 ⁴	50.95
Rental cottage or camp	-30.02 ⁴	47.60

*Statistically significant at $p \leq .001$

¹Percentage decrease or increase with range of -100% to +100%.

²Statistically significant difference between specialized and non-specialized participants.

³Statistically significant different among motivation groups.

⁴Statistically significant different among residential setting groups.

Locations that saw the greatest decline in use included provincial, national and regional parks as well as conservation areas. The only location that received increased use was neighbourhood and city streets. Specialized recreationists reported significantly greater declines in using private land or water resources, regional, provincial and national parks, conservation areas, wilderness areas, and outdoor education centers than their non-specialized counterparts. Achievers indicated using provincial parks significantly less than Amotivated Recreationists. Achievers also reported using national parks, wilderness areas and outdoor education centers significantly less than Nature Lovers and Socializers. Rural residents indicated significantly more use of private land or water than urban and suburban residents. In fact, they reported a 6.5% increase while urban and suburban residents reported at least a 13% decline in this resource use. While rural residents used neighbourhood and city streets 24% more, it was significantly less than the increases for suburban (37%) and urban (38%) residents. While all the use of city or town parks and school district property declined for all residential groups, it was a significantly greater decline for rural and suburban residents than for urban residents. Use of wilderness areas and boat ramps also declined for all groups. However, it was a significantly greater decline for suburban and urban residents than for rural residents for both locations. Finally, while use of private and rental cottages or camps declined for all groups, it was significantly more for suburban residents than for rural residents.

Change in Group Size

What was the average group size you participated in outdoor recreation activities with...?	Mean*	Standard Deviation
Before COVID-19 (March 17, 2020)?	5.48	8.32
After COVID-19?	1.56	2.12

*Statistically significant at $p \leq .001$

Respondents indicated the size of the group in which they participated in outdoor recreation activities was significantly smaller after the start of COVID-19.

Factors Influencing Outdoor Recreation Decision-Making

Importance of Decision-Making Factors

How important are these factors when making decisions about participating in outdoor recreation activities?	Mean*	Standard Deviation
How severe I perceive the COVID-19 threat in the area I am going. ¹	4.88	1.82
How likely I think I'll get COVID-19 while engaging in outdoor recreation. ¹	4.10	1.99
The chance that I'll spread COVID-19 to others through outdoor recreation. ¹	4.53	1.99
The outdoor recreation behaviours of my friends and family. ²	4.38	1.77
The outdoor recreation behaviours of others around me. ²	4.70	1.74
The information I get on the news about COVID-19. ²	4.93	1.61
The information I get on social media about COVID-19. ²	3.71	1.73
The recommendations from provincial government health officials. ³	5.85	1.34
The recommendations from federal government health officials. ³	5.75	1.40
The recommendations from the World Health Organization. ³	5.17	1.63
Recommendations from the land management agency regarding COVID-19 and outdoor recreation participation. ³	5.20	1.63
The open/closed status of outdoor recreation areas. ³	6.19	1.21
The need/desire to exercise. ⁴	5.88	1.19
The need/desire for improved mental health or stress relief. ⁴	6.14	1.07
The need/desire for improved overall health. ⁴	6.06	1.10
To fill time I normally do other things that I can't do because of COVID-19. ⁵	4.60	1.79
To get out/away from home. ⁵	5.46	1.48
The need/desire to engage in "safe" activities during COVID-19. ⁵	5.49	1.44

*Scale: 1=Not at all important, 2=Low importance, 3=Slightly important, 4=Neutral, 5=Moderately important, 6=Very important, 7=Extremely important

¹Measure of Perceived Risk

²Measure of Social Norms

³Measure of Orders from Authority

⁴Measure of Health Benefits

⁵Measure of Substitution

Reliability of Decision-Making Scales

	Mean	Cronbach's Alpha
Perceived Risk	13.50*	0.85**
Social Norms	17.72*	0.81**
Orders From Authority	28.13*	0.81**
Health Benefits	18.09*	0.87**
Substitution	15.54*	0.81**

*Scale: 1=Not at all important, 2=Low importance, 3=Slightly important, 4=Neutral, 5=Moderately important, 6=Very important, 7=Extremely important

**Satisfactory reliability (Vaske, Beaman & Sponarski, (2017)

Differences in Decision-Making Factors

Mauchly's W	<i>p</i>-value	Huynh-Feldt Epsilon
0.562	<.001	0.775*
Omnibus Test	<i>F</i>-Statistic	<i>p</i>-value
	3145.99	<.001
Significant Pairwise Comparisons	Mean Difference	<i>p</i>-value**
Perceived Risk - Social Norms	-4.19	<.001
Perceived Risk - Orders from Authority	-14.64	<.001
Perceived Risk - Health Benefits	-4.54	<.001
Perceived Risk - Substitution	-1.99	<.001
Social Norms - Orders from Authority	-10.45	<.001
Social Norms - Health Benefits	-0.35	0.25
Social Norms - Substitution	2.20	<.001
Orders from Authority - Health Benefits	10.10	<.001
Orders from Authority - Substitution	12.65	<.001
Health Benefits - Substitution	2.55	<.001

*Huynh-Feldt correction used as assumption of sphericity was not met.

**Bonferroni correction used to adjust for multiple comparisons.

Using scales adapted from Rice et al. (2020), respondents were asked to rate the level of importance of several factors impacting outdoor recreation decision-making during COVID-19. Participants indicated that Health Benefits were the most significant factor in making decisions. Social Norms were identified as being more significant than Perceived Risk and Substitution but less significant than Orders from Authority. Social Norms were not significantly different from Health Benefits. Orders from Authority were significantly more important than Perceived Risk, Health Benefits and Substitution. Health Benefits were significantly more important than Perceived Risk and Substitution. Finally, Substitution was significantly less important than Perceived Risk.

Probability of Returning to Previous Outdoor Recreation Behaviours

How probable are you to return to your past outdoor recreation practices when COVID-19 stay-at-home physical distancing rules are removed/relaxed? ^{1,ns}	Frequency	Percent
Not probable	8	0.5
Somewhat improbable	35	2.3
Neutral	41	2.7
Somewhat probable	171	11.3
Very probable	1259	83.1
Prefer not to answer	1	0.1

¹Statistically significant difference between non-specialized and specialized groups at $p < .001$.

^{ns}No statistically significant difference among motivation groups.

Almost 95% of respondents indicated it is somewhat or very probable they will return to their previous outdoor recreation behaviours. Non-specialized outdoor recreationists are significantly less probable to return to their past outdoor recreation practices. There was no significant difference for outdoor recreationists based on type of motivation.

Anticipated Changes in Outdoor Recreation Behaviour

Perceived Change in Outdoor Recreation Behaviour After COVID-19

Do you think your outdoor recreation behaviour (i.e., where you go, who you go with, how you engage in outdoor recreation) will change once the COVID-19 pandemic has been declared over? ¹	Frequency	Percent
Yes	869	57.8
No	635	42.2

¹Statistically significant difference at $p < .001$.

If Yes, Type of Difference in Outdoor Recreation Behaviour After COVID-19

My recreation behaviours after COVID-19 will be different from my behaviours before the pandemic...	Mean*	Standard Deviation
I will travel further than I previously did for outdoor recreation.	3.92	1.73
I will use local public land more often.	4.89	1.44
I will engage in more types of outdoor recreation.	4.93	1.55
I will engage in outdoor recreation activities that promote physical health.	5.86	1.07
I will engage in outdoor recreation activities that promote mental health.	5.95	1.05
I will change the types of outdoor recreation activities I do.	3.96	1.62
I will change the time of day I participate in outdoor recreation activities.	4.04	1.65
I will change the day of the week I participate in outdoor recreation activities.	3.73	1.62
I will avoid other people when I participate in outdoor recreation activities.	4.41	1.65
I will volunteer for outdoor or environmentally-focused organizations.	4.02	1.58
I will advocate for the protection of outdoor recreation resources and areas.	5.51	1.44
I will vote for politicians and/or laws that protect places for outdoor recreation.	5.98	1.24

*1=Strongly Disagree, 2=Disagree, 3= Somewhat Disagree 4=Neutral, 5=Somewhat Agree, 6= Agree, 7=Strongly Agree

Future Use of Closed Outdoor Recreation Areas

If outdoor recreation areas continue to remain closed due to stay-at-home, physical distancing measures, how likely are you to access those areas even if they are officially closed to the public?	Frequency	Percent
Definitely not	440	29.0
Extremely unlikely	287	18.9
Unlikely	289	19.1
Neutral	108	7.1
Likely	248	16.3
Extremely likely	89	5.9
Definitely will	56	3.7

Using measures adapted from Rice et al. (2020), approximately 58% of respondents indicated they will change their outdoor recreation behaviours after the COVID-19 pandemic has been declared over. Of possible differences in outdoor recreation behaviours, respondents agreed that voting for politicians and/or laws that protect public places, engaging in outdoor recreation activities that promote mental and physical health, and avoiding other people when participating in outdoor recreation were the biggest changes. Respondents agreed to a lesser extent that they would change the day of the week they participate in outdoor recreation activities or travel further than they previously did. Over two-thirds of respondents (67%) indicated it is unlikely they would use outdoor recreation areas if they were to remain closed. However, approximately 25% indicated it was likely they would use areas, despite their being closed.

Health Impacts

Mental Health

	Mean ^{^1}	Standard Deviation
Before COVID-19 (March 17, 2020)?*	55.96	8.31
Since COVID-19?*	46.62	11.12

*“Keeping in mind how your outdoor recreation participation affects your mental health, please respond to each statement by selecting the response that best fits how you have generally been before the start of COVID-19 and since the start of COVID-19 in Canada (March 17, 2020). There are no right or wrong responses and it is important that your responses reflect how you feel you are doing at that point in time. Often the first answer that comes to mind is best. Thank you for your thoughtful effort. Please be sure to respond to each statement.”

[^]Scale: 1=Never, 2= Rarely, 3=Occasionally, 4=Sometimes, 5=Frequently, 6=Usually, 7=Always

¹Statistically significant difference at $p < .001$.

General Health

When thinking about how COVID-19 has impacted your participation in outdoor recreation, to what degree do you feel... ¹	Mean ¹	Standard Deviation
Your physical health has changed?	2.75*	0.97
Your mental health has changed?	2.46*	0.83
Your overall health has changed?	2.74*	0.82

¹Scale: 1=Much Worse, 2=Somewhat Worse, 3=About the Same, 4=Somewhat Better, 5=Much Better

*Statistically significant difference at $p < .001$.

The Schwartz Outcomes Scale-10 (Blais et al., 1999) was used to measure psychological well-being and quality of life. Respondents indicated a significant decrease in psychological well-being when considering their outdoor recreation participation since the start of physical distancing measures. In terms of general health, participants indicated their physical, mental and overall health were, on average, somewhat worse after the start of COVID-19 when compared to staying about the same. This was statistically significant.

Authors' Notes

Special thanks to Derrick Taff (Penn State University) and his research team for permission to adapt their scales for this study. Please visit [Leave No Trace Center for Outdoor Ethics](#) for results of their study investigating the impacts of COVID-19 on outdoor recreation in the United States.

References

- Blais, M. A., Lenderking, W. R., Baer, L., deLorell, A., Peets, K., Leahy, L., & Burns, C. (1999). Development and initial validation of a brief mental health outcome measure. *Journal of Personality Assessment*, 73(3), 359-373.
- Jun, J., Kyle, G., Graefe, A., & Manning, R. (2015). An identity-based conceptualization of recreation specialization. *Journal of Leisure Research*, 47(4), 425-443.
- Rice, W. L., Meyer, C., Lawhon, B., Taff, B. D., Mateer, T., Reigner, N., & Newman, P. (2020). *The COVID-19 pandemic is changing the way people recreate outdoors. Preliminary report on a national survey of outdoor enthusiasts amid the COVID-19 pandemic*. Retrieved from <https://lnt.org/research-resources/leave-no-trace-covid-19-research/>
- Vaske, J. J., Beaman, J., & Sponarski, C. (2017). Rethinking internal consistency in Cronbach's alpha. *Leisure Sciences*, 39(2), 163-173.
- White, D. D. (2008). A structural model of leisure constraints negotiation in outdoor recreation. *Leisure Sciences*, 30(4), 342-359.