

REGIONAL ECONOMIC IMPACTS OF BOUNDARY WATERS WILDERNESS VISITORS



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With Support from Friends of the Boundary
Waters Wilderness and the Quetico-Superior
Foundation





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Acknowledgements: We would like to thank the numerous groups and individuals that provided input and offered assistance for this research. Any mistakes are the author's alone.

Specifically, we thank the staff at the Superior National Forest, the outfitter groups, and the Wilderness visitors that took the time to document their trip. We also appreciate assistance from Tonia Kittelson, Leah Dunn, Tom Holmes, Pete Morton, and Anwar Hussain.

Table of Contents

Executive Summary	ES1
I. Introduction	1
<i>A. Background for BWCAW Economic Impacts</i>	1
II. Methods	4
<i>A. Study Area</i>	4
<i>B. Regional Economic Impact Analysis (EIA)</i>	5
<i>C. Input-Output Framework and IMPLAN</i>	6
<i>D. Data Collection and Expenditure Profiles</i>	7
III. Results	8
<i>A. Regional Economic Impact Analysis Results</i>	9
IV. Summary	11
V. References	13
Appendix A: Descriptive Statistics for Survey Results	15
Appendix B: Extrapolating Sample Estimates to BWCAW Visitation	17
Appendix C: BWCAW Visitor Origin Map	19

Figures and Tables

<i>Figure 1: BWCAW Regional Economic Zone</i>	4
<i>Table 1: Description of BWCAW Regional Economy</i>	5
<i>Table 2: BWCAW Visitor Expenditures by Spending Category</i>	8
<i>Table 3: Top Ten Affected Sectors by Employment for BWCAW</i>	9
<i>Table 4: Total Effects and Multipliers for BWCAW Visitor Expenditures</i>	10
<i>Table 5: Total Taxes Generated By BWCAW Visitor Expenditures</i>	11
<i>Table A1: Trip Characteristics per Permit</i>	15
<i>Table A2: Trip Leader Characteristics</i>	15
<i>Table A3: Expenditure Type per Permit</i>	16

Executive Summary

First scientific quantification of Boundary Waters Wilderness regional economic impacts finds....

Out-of-region Boundary Waters Wilderness visitor spending in Summer 2016 created nearly 1,000 full and part-time jobs in St. Louis, Lake and Cook Counties in northern Minnesota.

These visitors spent nearly \$57 million in the three counties surrounding the BWCAW, generating \$77 million in economic output.

Outdoor recreation is an export industry for northeastern Minnesota, providing for stable employment and sustainable jobs year after year.

Background: The Boundary Waters Canoe Area Wilderness (BWCAW) in northeastern Minnesota is more than a million acres of connected lakes and rivers. This protected area is a refuge for wolves, moose, migrating warblers, loons, and myriad plants. Because of the beauty and the numerous recreational opportunities in the BWCAW, it is one of the most heavily visited Wilderness areas in the U.S. with an estimated 150,000 visitors in 2015. Most of these visitors come from outside the surrounding counties and have a tremendous economic impact on BWCAW gateway communities.

Towns adjacent to the BWCAW, such as Ely, Tofte, and Grand Marais specialize in providing services to outdoor recreationists and tourists. Many outfitters help prepare visitors for their BWCAW trip by providing canoes, guides, food, lodging, fishing equipment, and/or transportation. These BWCAW gateway communities have evolved with Boundary Waters tourism and now see a large portion of their regional economic activity dependent on expenditures from outdoor recreationists.



Clear Lake, Boundary Waters Canoe Area Wilderness

To date, there has been no quantification of the economic impacts of BWCAW tourism and economic estimates could be very helpful in regional economic development policy. Thus, this study is the first estimate of BWCAW regional economic impacts and represents the first impact analysis of a U.S. Wilderness area in two decades.

Methods: To discover how much BWCAW tourism affects these gateway communities, we conducted a regional economic impact analysis. Our primary methods:

- Data collection consisted of surveying 2016 summer season BWCAW visitors.
- Surveys were distributed by outfitters to permit holders.
- Visitors were asked to record their regional expenditures in Cook, Lake, and St. Louis Counties in northeastern Minnesota for 16 categories of spending.
- Expenditure averages for sampled BWCAW visitors were extrapolated to 2015 visitation data and entered into IMPLAN impact analysis software.
- Regional economic impact analysis was conducted in order to determine direct, indirect, and induced effects for regional output, employment, labor income, value added, and taxes.
- Multiplier effects were calculated and the sustainability and tradeoffs associated with BWCAW tourism were examined.



Canoeing and camping are primary activities in the Boundary Waters Canoe Area Wilderness.

Results:

- The final analysis evaluated 513 completed surveys, with an overall survey response rate of 40%.
- Approximately \$57 million of regional expenditures were estimated for 2016 summer season BWCAW visitors and entered into IMPLAN under 12 SIC industrial sectors.
- BWCAW visitation directly spurs 635 full-time equivalents (FTEs) jobs in the surrounding gateway communities. Including indirect and induced effects, 817 FTE jobs are generated by BWCAW tourism.
- BWCAW visitation generated \$50 million of direct regional output, and \$77 million of total regional output (includes indirect and induced output). Total effects are shown below in Table E1.
- Visitors come from all over, but especially from nearby Wisconsin, Illinois, Michigan, and the Twin Cities of Minneapolis and St. Paul, Minnesota.

Table E1: Total Annual Effects of BWCAW Visitor Expenditures (\$2014)

Impact Type	Employment*	Labor Income (Millions)	Total Value Added** (Millions)	Output (Millions)
Direct Effect	772.7	\$16.63	\$27.15	\$49.70
Indirect Effect	101.1	\$4.02	\$6.33	\$13.68
Induced Effect	110.7	\$4.42	\$7.55	\$13.84
Total Effect	984.5	\$25.06	\$41.03	\$77.23

Source: IMPLAN3, Northeast Minnesota Region 2014, Type SAM Multipliers

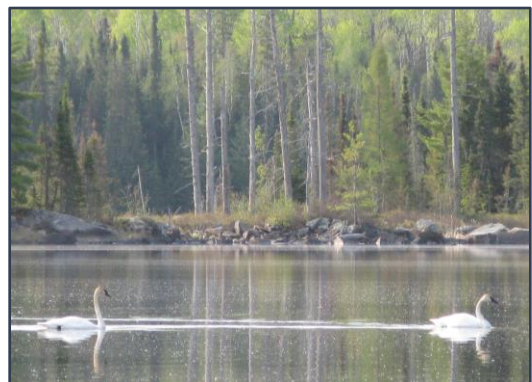
*Employment includes full and part time jobs.

**Value added is the difference between an industry's total output and its intermediate inputs. It includes employee compensation, taxes, and surplus.

Conclusions:

- The BWCAW has a substantial economic impact on Cook, Lake, and St. Louis counties' regional economies.
- BWCAW tourism should be considered as an export industry, exporting its product to southern Minnesotans, and to people from around the U.S and the world.
- This study understates the total economic impact from BWCAW visitor spending. It does not include winter visitor spending or visitor spending from locals within the region.
- Regional economic impacts documented in this study are only a portion of all market impacts; we did not assess other market impacts related to the BWCAW like photography or art sales, amenity migration effects, or property value changes in proximity to the BWCAW.
- The BWCAW also generates many other economic values related to use and passive use values and ecosystem services, which are not captured in this study.
- Outdoor recreation provides for stable employment and is a sustainable over time due to limited associated environmental damage coming from this export industry.

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Regional Economic Impacts of Boundary Waters Canoe Area Wilderness Visitors

I. Introduction

Designated Wilderness areas in the U.S. represent a unique type of protected public lands, as they are afforded the greatest protection and are typically in more remote areas with limited commercialization. Wilderness areas collectively provide for substantial national economic contributions, estimated to be over \$700 million in total output (Hjerpe et al. 2016). But due to the typically restrictive economic geography of Wilderness areas, overall visitation and opportunities for recreation-related spending are lower in the most protected public lands as compared to other public and private outdoor recreation venues. In most regions, outdoor recreation on public lands is one of multiple land uses in the region that often include resource extraction of timber and minerals. The balancing of multiple uses is supported by planning efforts that typically include the economic impacts of the various uses (e.g., Environmental Impact Statements). In many cases, detailed estimates of timber and mining economic impacts are available, but research on the regional economic impacts of outdoor recreation is often not available. Such is the case with the Boundary Waters Canoe Area Wilderness (BWCAW), the million-acre Wilderness area on the Superior National Forest in Northeastern Minnesota.

In this study, we examine the regional economic impacts of out-of-region Boundary Waters visitors to adjacent communities. Because the BWCAW represents a type of Wilderness area characterized by high visitation¹ and a focus on canoeing, the Boundary Waters makes for an interesting Wilderness case study. The economic impacts of recreation in the BWCAW are currently unknown, while extractive uses in the larger region such as mining are well documented and included in planning documents. Given the importance of BWCAW recreation to regional outfitting and service businesses and to gateway communities, it is prudent to quantify the overall regional economic impacts so as to illustrate the regional economic dependencies. To address this, we conduct a regional economic impact analysis, which traces the backward linkages and net regional effects of tourist expenditures (Watson et al. 2007). BWCAW visitors in 2016 were surveyed to determine their regional expenditures and impacts in regional output, employment, income, and value added were calculated using IMpact analysis for PLANning (IMPLAN) software. Economic impacts of outdoor recreationists in the BWCAW can be helpful for future public lands planning efforts and can inform regional development strategies.

A. Background for BWCAW Economic Impacts

Economic impact analysis (EIA) is a method for understanding how gateway communities are affected by visitor expenditures. As tourists come to the BWCAW, businesses located in surrounding communities

¹ The BWCAW is estimated to be the most heavily visited Wilderness area in the U.S. with approximately 150,000 annual visits.

such as Ely, Tofte, and Grand Marais provide lodging, outfitting, and guiding services for trips into the Wilderness. Though largely seasonal in nature, tourist spending associated with a Boundary Waters trip generates substantial employment and income in adjacent towns (Lichty and Steinnes 1982).

Visitor surveys are the best way to determine the amount of regional spending associated with a Wilderness trip. Expenditure data can be collected with surveys and analyzed in an Input-Output (I-O) matrix, where all individual industries are both a buyer and seller of goods and services. The sector contributions can be analyzed to illustrate backward linkages associated with the production of final goods. For example, visitor expenditures at Boundary Waters area restaurants are for the dining experience, while the restaurant must purchase raw materials (food), electricity, and cleaning services to provide the dining experience. Regional I-O models delineate how much of the food and services needed for production are purchased locally.

The direct effects are represented by visitor purchases of food and beverages. The backward linkages, in terms of accounting for the local goods and services purchased by the restaurant to produce the dining experience, represent the indirect effects. A recirculation of the wages from restaurant workers in the community are known as induced effects. Direct, indirect, and induced effects are combined for a presentation of total effects and can be divided to represent multiplier effects. Because each industry requires different amounts and types of backward linkages, and because each industry pays different wages, each sector has unique indirect and induced effects. The typical multiplier (Type SAM) endogenizes household and government spending into the I-O framework and is calculated as the ratio of total effects to direct effects and can be illustrated for industries in terms of output, employment, labor income, taxes, and value added (Loomis and Walsh 1997).

The estimation of the backward linkages and regional multipliers associated with Wilderness visitation has been few. In fact, we are only aware of one published economic impact analysis of Wilderness visitor expenditures--- Keith and Fawson's 1995 study of regional expenditures from visitors to four Utah Wilderness areas. Keith and Fawson (1995) found regional expenditures of \$30 to \$40 per person per day at nearby businesses. Others have examined the economic impacts of wildland-based recreation activities (e.g., Moisey and Yuan 1992, Yuan and Christensen 1994), finding similar per day expenditures. Rudzitis and Johnson (2000) and Rosenberger and English (2005) have summarized existing economic impact studies on Wilderness area visitation and have detailed considerations for conducting Wilderness economic impact analyses.

On the other hand, there have been many estimates of the economic impacts of outdoor recreation in general (e.g., Bergstrom et al. 1990, Loomis and Walsh 1997, Clawson and Knetsch 2013). Nationally, outdoor recreation has been estimated to be a \$650 billion annual industry in the U.S.² with increasing

² Outdoor Industry Association estimate at:
http://outdoorindustry.org/pdf/OIA_OutdoorRecEconomyReport2012.pdf

trends expected in both participation and recreation-related expenditures (White et al. 2014). While only a small portion of this output is generated from Wilderness visitation, much of the estimated recreation economic impacts stem from the use of protected public lands. Carver and Caudill (2013) estimated overall visitation and regional economic impacts for U.S. Fish and Wildlife Service lands, finding that some 47 million visitors to refuges in 2011 spurred approximately \$2.5 billion of regional output. On National Forest System lands, the National Visitor Use and Monitoring (NVUM) program involves extensive surveying of visitors to protected public lands including recording regional expenditures. Multiple rounds of NVUM monitoring have resulted in a number of economic impact profiles for various outdoor recreation activities (e.g., White and Stynes 2008) and indicate the importance of outdoor recreation on protected public lands.

Recreation in the BWCAW, as indicated by the name, is primarily canoeing and boating on some of the myriad lakes in the Boundary Waters. While hiking, skiing, and dog mushing also occur in the BWCAW, the majority of visitor activities are related to paddling, fishing, and camping (Dvorak et al. 2012). As boating requires a bit more gear and accommodations than traditional Wilderness recreational activities of hiking and backpacking, we expect regional Boundary Waters visitor economic impacts to be greater than impacts in most other regions surrounding Wilderness areas (the exceptions may be Western Wilderness areas with seasonally intense multi-day horse packing or rafting trips). Lichty and Steinnes (1982) examined the economic impacts of tourism in Ely, MN, adjacent to the Boundary Waters by surveying local businesses to determine their total sales to residents and non-residents. They found over \$13 million of total output, when including indirect and induced effects, was generated by tourism spending in Ely.

Other boating-related regional EIAs have been conducted, including a recent examination of canoeing in the Northeastern U.S. Pollock et al. (2012) looked at regional economic impacts of canoeing on the Northern Forest Canoe Trail and found that canoers spurred about \$14 million in regional output, and about 280 jobs from \$46 of spending per day. Similar impact studies have been conducted for rafting remote, destination rivers that include some Wilderness and Wild and Scenic designations such as the Gauley in West Virginia and the Middle Fork in Idaho (English and Bowker 1996), recreation on rivers managed by the National Park Service (Cordell et al. 1990), and rafting in the Grand Canyon (Hjerpe and Kim 2007). These river-related studies found recirculation of expenditures, or multiplier effects, ranging from 1.30 – 2.49 for regional output, and 1.26 – 1.90 for regional employment.

The previous synthesized literature was used to help inform our EIA methods and to provide comparisons to our estimated regional economic impacts of BWCAW visitors. Research indicates that particularly in rural, remote landscapes, outdoor recreation can provide an economic stimulus to gateway communities. These regional economic impacts are sustainable into the future and can be critical in helping keep protected lands conserved for future generations.

II. Methods

To estimate the economic impacts of BWCAW visitors we surveyed BWCAW permit trip leaders in the summer of 2016. Expenditure data were collected by types of industry sectors that comprise the broader outdoor recreation industry such as outfitter services, lodging, and restaurants. Expenditure profiles were extrapolated to estimated portions of annual visitors to the BWCAW and entered into IMPLAN's impact analysis. Descriptive statistics were documented and regional economic impacts were estimated for output, employment, income, value-added, and taxes with additional investigations of multiplier effects. Detailed methods are presented in the following sections.

A. Study Area

The BWCAW regional economic zone was defined as the three Northeastern Minnesota counties that encompass and surround the BWCAW— St. Louis, Lake, and Cook Counties (see Figure 1).

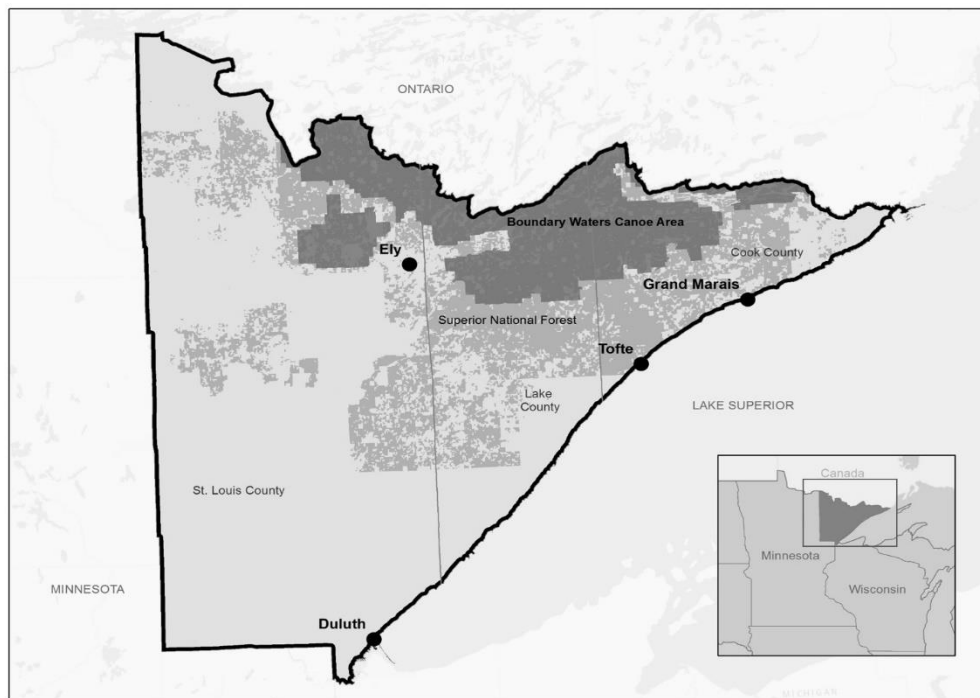


Figure 1: BWCAW Regional Economic Zone: St. Louis, Lake, and Cook Counties, MN

The size of the affected regional economy in regional EIAs has direct implications for determining overall recreation expenditures attributed to the BWCAW, and their correlating direct, indirect, and induced effects. The larger the defined regional economy, the greater, the resulting multiplier will be as expenditures have more potential to be recirculated (Hjerpe and Kim 2007, Watson et al. 2007). However, the greater the size of the defined regional economy, the less the importance of the overall activities among a much bigger pool of economic output (i.e., the percentage of an economy's

dependence on a specific industry decreases as it enters larger economies). Recommendations for matching a regional economy to the economic activity being measured include isolating gateway communities and considering the range of infrastructure and emergency services most impacted by the activity (Hjerpe and Kim 2007). Stynes³ suggests that the most affected areas, and thus the defined regional economy, should be all counties within 30 miles of the recreation/tourism destination. We feel that the three Northeastern counties in Minnesota (St. Louis, Lake, and Cook) are the appropriate regional economy as they are the most affected by BWCAW outdoor recreation.

The BWCAW and Cook, Lake, and St. Louis Counties are located in the heart of the Arrowhead Region of Northeastern Minnesota. The Arrowhead Region is typified by small rural communities and has long been a tourist destination as well as home to intense iron mining. Taconite is the predominant exported good of the region. In this three-county zone, the city of Duluth is farthest away from the BWCAW and has almost half the population of all three counties. Table 1 presents the three-county totals.

Table 1: Description of BWCAW Regional Economy (Cook, Lake, and St. Louis Counties)

<i>Gross Regional Product</i>	\$10,544,000,000
<i>Total Personal Income</i>	\$9,409,000,000
<i>Total Employment</i>	131,200
<i>Number of Industries (SIC)</i>	282
<i>Land Area (sq. miles)</i>	9,780
<i>Population</i>	216,900
<i>Total Households</i>	96,100
<i>Average Household Income</i>	\$97,900

Source: IMPLAN3, Northeast Minnesota Region 2014

B. Regional Economic Impact Analysis (EIA)

Regional economic impact analysis (EIA) measures the changes in regional economic indicators associated with the addition or loss of a set of particular economic activities. The economic indicators typically evaluated include employment and output and the defined regional economies are typically composed of an individual county, multiple counties, or an entire state. For the Boundary Waters regional EIA, we investigated the question of size, type, and scale of economic activity that might be lost in Northeastern Minnesota if there was no BWCAW tourism.

³ Available at <https://msu.edu/user/stynes/mirec/concepts.htm>.

The focus of regional EIA is to estimate the *net* effect to a particular economic region of a specific economic activity. It differs from economic contribution analysis by strictly focusing on out-of-region spending by visitors that can be attributed to the BWCAW (Watson et al. 2007). In accordance with EIA, we asked participants whether they lived inside or outside the BWCAW regional economic zone. The survey also included questioning whether the BWCAW was the primary reason for their trip and asking locals about substitute behavior. These percentages were then used for extrapolation to our overall population so as not to include expenditures from locals. We also asked participants to only record expenditures that were transacted within the defined BWCAW regional economic zone. While there may be substantial out-of-region money spent for trips to the BWCAW, such as flying into Minneapolis, these trip related expenditures are not directly realized by the gateway communities surrounding the BWCAW and are to be excluded in regional EIA.

C. Input-Output Framework and IMPLAN

IMPLAN modeling software utilizes an input-output (I-O) framework that balances industry inputs and outputs to track the relative influence of each sector. I-O frameworks were predicated on economic base theories where a region's exports were the primary source of outside money to enter the region. The exporting industries, or basic sectors of the economy, were responsible for the in-filling of trade and services within the regional communities. Outdoor recreation and nature tourism has been treated similarly to export industries as they are bringing outside money to the region for the consumption of a local product, the BWCAW.

We estimated regional BWCAW visitor economic impacts within IMPLAN. IMPLAN is a common tool for assessing economic impacts, but comes with a number of methodological assumptions that need to be acknowledged and understood for appropriate impact descriptions. Even before detailing IMPLAN assumptions, it is important to remember that regional EIA and IMPLAN analyses are only a partial view of the full economic picture of land use and conservation. EIA is used to estimate market impacts such as job numbers and income. These impacts are different from the values associated with the societal economic benefits and costs of land use and conservation that are used to examine economic efficiency with Benefit-Cost Analysis (BCA). Costs and benefits look more at the changes in use and passive use values of land management, whereas EIA traces the movement of regional economies through the perspective of indicators such as jobs, taxes, output, and income. Importantly, EIA does not suggest which projects yield the greatest benefit to society. Rather, EIA illustrates the level of connectedness among industry sectors and net changes in market indicators. As such, EIA of BWCAW visitor expenditures does not capture many other values held by tourists and the public for Wilderness areas and should ultimately be combined with a number of economic modeling approaches (Driml 1997).

Within this partial view, there are some strict methodological assumptions incorporated into IMPLAN that have implications for the presentation of results. IMPLAN's impact analyses represent a snapshot in time, and does not dynamically adjust forward for reactionary economic effects as done in

computable general equilibrium (CGE) models. IMPLAN allows for tracing the backward linkages associated with a stimulus. Other assumptions, such as fixed technology, constant return to scales, and a lack of supply constraints, lead to a linear and slightly simplified model of total regional economic activity. Nevertheless, IMPLAN has been illustrated to be an effective performer for impact analysis of recreation when compared to other models (Crihfield and Campbell 1991, Bergstrom et al. 1990) and is often preferred for its ease of use and affordability.

Given that regional EIA is only a partial view of total economics, and the technical constraints necessary for IMPLAN modelling, estimated economic impacts should be properly qualified. For example, the expected duration of jobs and impacts should be considered (Driml et al. 2016), as should the expected sustainability of jobs within ecological limits be considered (Hjerpe et al. 2016). We present these considerations for BWCAW recreation in the Discussion section.

D. Data Collection and Expenditure Profiles

A survey was conducted to obtain estimates of regional expenditures from BWCAW visitors. Survey design and administration were a combined effort from economists, regional conservation organizations, wilderness managers with the US Forest Service, and regional outfitters. Over a three-month period various iterations of the survey were pretested and improved based on feedback from numerous stakeholders. The final survey instrument contained ten questions on visit and visitor characteristics and 16 expenditure questions related to outfitting, lodging, dining, and retail consumption.

The USFS administers a permit system for the BWCAW that includes a quota system with a lottery system for certain use areas. The majority of BWCAW permits are picked up by recreationists in commercial outfitter and guide businesses in the gateway communities leading to the BWCAW. We worked with outfitters to have expenditures surveys offered to trip leaders that were picking up their permits. To incorporate regional differences, we recruited 12 outfitters from across all BWCAW access points to distribute the expenditure questionnaires. Surveys were distributed throughout the summer of 2016, from June through mid-September and captured a range of overnight and day users.

Participants were asked to answer 26 questions about their trip to the BWCAW. Surveys were printed on two fold out pages inside a self-addressed stamped envelope. The introduction of the survey offered participants the option to record their survey online, where the exact same set of questions were available via computer entry. To increase response rate, we offered a cash incentive of \$100 to be randomly awarded to five participants.

Average regional expenditures were applied to the type and amount of BWCAW annual visitors using recent BWCAW visitation trend analysis from the Superior National Forest⁴ (see Appendix B for details).

⁴ Available at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd513976.pdf

These BWCAW tourist expenditures were entered as final demand into the IMPLAN sectors for our three-county regional economic zone. Commodities such as retail goods were margined in order to convert purchaser prices into producer prices contained in the SAM. Local purchasing coefficients were set to 100% for the region and all 2016 expenditures were deflated to Year 2014 dollars used in IMPLAN. Based on interviews with USFS managers, about 95% of the BWCA Wilderness Permit fees stayed in the local region to be used for BWCAW management and administration. For the permit fees category, local final demand was entered at 95% of total estimated permit fees.

III. Results

The survey was administered from May through September of 2016, with a total of 513 respondents. With approximately 1300 surveys being distributed, the overall response rate was 40%. For the full descriptive statistics of responses, please see Appendix A. The sample expenditures were extrapolated to the appropriate set of 2015 BWCAW visitors to determine overall annual regional expenditures and to illustrate the losses to regional economic activity that would occur without BWCAW visitation. The sample estimates were applied to 125,000 summer visitors from 2016 and excluded local visitors and visitors that indicated that the BWCAW was not the primary reason for their visit to Northeastern Minnesota (see Appendix B for full details).

Table 2: BWCAW Visitor Expenditures by Spending Category (In-region*)

Expenditure Type (IMPLAN Sector--SIC Code)	Estimated Annual Expenditures
Outfitting (Other Amusement and Recreation Industries--496)	\$29,757,021
Lodging (Hotels and Motels--499)	\$ 6,685,086
Food and Drink (Full Service Restaurants--501)	\$ 4,375,494
Fishing, Camping, and Boat Gear (Retail – Sporting Goods--404)	\$ 3,281,119
Shuttles and Transportation (Scenic and Sightseeing Transportation--414)	\$ 2,827,091
Groceries (Retail Stores – Food and Beverage--400)	\$ 2,184,570
Clothes (Retail – Clothing--403)	\$ 1,891,592
Miscellaneous Retail (Retail—General Merchandise Stores--405)	\$ 1,652,975
Gasoline and Oil (Retail Gas Stores--402)	\$ 1,482,685
Fishing Licenses (Employment of State Government, Non-education--531)	\$ 1,261,951
BWCAW Permits (Employment of Federal Government, Non-military--535)	\$ 1,234,810
Car Repairs (Automotive Repair and Maintenance--504)	\$ 102,745
Total	\$56,737,141

*Spending only within Cook, Lake, and St. Louis Counties, excludes out-of-region expenditures for BWCAW visits.

Non-response bias was considered, but without contact information for trip leaders that did not respond, there is no specific information concerning non-respondents. To account for the potential of non-respondents to have fewer expenditures than respondents, we made conservative estimates when extrapolating our sample expenditures to the total number of BWCAW visitors.

Estimated 2016 annual BWCAW visitor expenditures were aggregated into 12 industry sectors and entered into IMPLAN's impact analysis for the three county region in Northeastern Minnesota. In total, approximately \$57 million was spent in the region by out-of-region visitors on their trip to the BWCAW. Table 2 illustrates the expenditure amounts and types and their correlating IMPLAN SIC sectors.

A. Regional Economic Impact Analysis Results

BWCAW tourist expenditures were entered into IMPLAN's impact analysis as final demand in the region. Some of this final demand immediately leaves the region as leakage, especially for margined commodity purchases such as gasoline and clothing that are produced outside of the region. The \$57 million dollars of annual final demand was realized as a \$50 million direct effect on regional output, and almost \$80 million in regional output when including indirect and induced effects of BWCAW visitation. Direct, indirect, and induced effects were calculated for employment, total labor income, and value added in addition to regional output. Table 3 presents total effects for the most affected industry sectors in terms of employment. Total employment (full and part time jobs) are shown next to full-time equivalent (FTE) conversions.

Table 3: Top Ten Affected Sectors by Employment for BWCAW Visitor Expenditures (\$2014)

Description	Total Employment**	Total FTE Employment***	Total Labor Income (\$Millions)	Total Output (\$Millions)
Other amusement and recreation industries	514	422	7.79	29.83
Full-service restaurants	109	85	2.09	4.81
Hotels and motels, including casino hotels	68	62	1.65	6.75
Retail - Sporting goods, hobby, art stores	27	23	0.69	1.43
Real estate	18	16	0.24	2.39
Retail - Clothing and clothing accessories stores	15	13	0.29	1.04
Employment and payroll of state govt., non-education	14	12	1.09	1.26
Retail - Food and beverage stores	13	12	0.42	0.87
Scenic and sightseeing transportation	13	12	2.05	3.17
Retail - General merchandise stores	12	10	0.30	0.80
Total*	985	817	\$25.06	\$77.23

*Includes all sectors and indirect and induced effects.

**Includes full and part-time jobs.

***Total employment converted to full-time equivalents (FTEs) based on industry-specific IMPLAN conversion rates.

BWCAW visitor expenditures generated approximately 775 full and part time jobs in the region in these 12 industry sectors. When including indirect and induced effects, almost 1,000 full and part time jobs were generated across 127 different regional industries. Because industries supplying outdoor recreation services are seasonal, the full-time equivalent (FTE) number of jobs is also presented (see Table 3), representing over 800 FTE jobs in these three Minnesota counties.

Total effects for four categories are presented below (Table 4). The ratio of total to direct effects is the multiplier effect. For the BWCAW gateway communities, each dollar spent by tourists generates another 55 cents of regional output by associated suppliers and services—an output multiplier of 1.55. For every \$1,000 of income generated by BWCAW tourist expenditures, another \$510 of income is spurred in industries associated with outfitters, lodges, restaurants, and stores—an income multiplier effect of 1.51. In terms of employment, each 100 visitor services job generates another 27 support jobs—an employment multiplier of 1.27.

Table 4: Total Effects and Multipliers for BWCAW Visitor Expenditures (\$2014)

Impact Type	Employment	Labor Income (Millions)	Total Value Added* (Millions)	Output (Millions)
Direct Effect	772.7	\$16.63	\$27.15	\$49.70
Indirect Effect	101.1	\$4.02	\$6.33	\$13.68
Induced Effect	110.7	\$4.42	\$7.55	\$13.84
Total Effect	984.5	\$25.06	\$41.03	\$77.23
Multiplier Effect	1.27	1.51	1.51	1.55

Source: IMPLAN3, Northeast Minnesota Region 2014, Type SAM Multipliers

*Value added is the difference between an industry's total output and its intermediate inputs. It includes employee compensation, taxes, and surplus.

BWCAW visitor expenditures also spur significant tax receipts for local and state administration and for federal management. Taxes are needed to help manage roads, provide emergency services, and help manage the BWCAW. Wilderness tourism in Northeastern Minnesota brings a return on the land that communities can invest with for decades to come. For example, remote Cook County, Minnesota assesses a three percent lodging tax and have seen steady annual increases in this area. In 2015, Cook County accrued more than one million dollars in lodging taxes.⁵ A large portion of these lodging taxes

⁵ Available at: <http://www.co.cook.mn.us/2016site/index.php/auditor-documents?task=document.viewdoc&id=165>

come in the summer months and many of the visitors are there for the BWCAW. Table 5 shows total regional and federal taxes spurred by BWCAW tourists.

Table 5: Total Taxes Generated By BWCAW Visitor Expenditures (In Millions of \$2014)

	Employee Compensation	Proprietor Income	Tax on Production and Imports	Households	Corporations
Total State and Local Tax	\$0.06	--	\$6.83	\$0.83	\$0.11
Total Federal Tax	\$2.80	\$0.15	\$1.09	\$1.89	\$0.60

Source: IMPLAN3, Northeast Minnesota Region 2014

IV. Summary

Regional spending by BWCAW visitors has a strong impact in Northeastern Minnesota. The almost \$60 million of regional spending in 2016 has cascading effects throughout the region. Importantly, these tourist expenditures represents new money to the region from outside of the region. Outdoor recreation and tourism is treated as an export industry, where Northeastern Minnesota is marketing a product beyond just local consumption. This outside money brought into the region represents a basic industry and spurs the need for community in-filling services such as medical, financial, and entertainment services.

In terms of total economic contributions, more than \$60 million of annual regional spending is associated with BWCAW visitation. This study focuses strictly on the amount of in-region expenditures made by out-of-region tourists. Three percent of visitors surveyed lived in the three-county region and their BWCAW trip expenditures were excluded. We also excluded expenditures made by people combining the BWCAW with other trips (non-primary) to see friends or to boat elsewhere such as the Quetico. Additionally, the 10,000 or so off-season BWCAW visitors spend money in the region and these expenditures were not included.

Combined, there are many more regional expenditures associated with BWCAW visitation. We focus on new money coming to the region, but acknowledge the importance of recirculated local dollars and out of region expenditures made for BWCAW trips, that are not included in our regional impact analysis. Likewise, the BWCAW spurs numerous other market impacts that are more difficult to measure and are not included in this study. Amenity migrants and retirees have moved to the region to be closer to the BWCAW, bringing investments and income permanently into the region.⁶ Media consumption in terms of purchased BWCAW photography, research, art, and stories can have a large regional economic impact and can be primarily attributed to the BWCAW. Many associated tourist attractions, such as the International Wolf Center in Ely, are primarily dependent upon BWCAW tourists.⁷ In total, the market

⁶ A survey respondent documented that they recently moved to the region simply to be closer year-round to the BWCAW.

⁷ Also documented by survey respondents.

impacts of the BWCAW are much more wide-reaching than just the tourist expenditures captured in this study.

While there has been little research on the economic impacts of Wilderness areas, we presume that due to high visitation and high per person expenditures, BWCAW economic impacts are much greater than impacts associated with typical Wilderness areas. The multiplier effects found for BWCAW visitor expenditures are similar to multipliers found in previous studies of boating in rural areas and similar to reported mining multipliers in the Arrowhead region.⁸ Ranging from 1.27 for employment to 1.55 for output, BWCAW economic multipliers indicate that the outfitter and service businesses related to the BWCAW require and support additional economic activity in the region. However, as is the nature of more rural counties, many goods and services are necessarily imported into the region leading to leakage of tourist expenditures from Northeastern Minnesota.

While outdoor recreation and nature tourism is characterized by seasonal employment and tends to be associated with lower wages when compared to extractive industries, it can play a very complementary role in balanced regional development. The duration and sustainability of these jobs is much greater than extractive industries based on nonrenewable resource extraction and nature tourism is not as susceptible to market volatility. Likewise, technological improvements in resource extraction are decreasing the number of jobs per unit of extraction, while outdoor recreation services remain labor intensive. As is the case with BWCAW visitation and its substantial economic impacts in rural Northeastern Minnesota, Wilderness recreation can play a key role in economic development now and well into the future.

⁸ University of Minnesota Duluth's economic impact analysis of exported goods to Canada from the Arrowhead Region found regional multipliers ranging from 1.29 for output, 1.53 for income, and 2.1 for employment. The predominant exported good was iron ore. But it is important to note that these multipliers were calculated for a nine-county Arrowhead region of Northeastern Minnesota, about twice the size of our three-county region. The larger the defined regional economy, the greater the resulting multiplier effect will be. Thus, an apples-to-apples comparison is not feasible. The study can be found here: https://lsbe.d.umn.edu/sites/lsbe.d.umn.edu/files/canada_minnesota_connection_report_final.pdf.

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Appendix A: Descriptive Statistics for Survey Results

In total, 518 survey responses were collected with five surveys being returned blank. The final sample size was 513 usable surveys. Participants were offered a choice of mailing the survey or conducting the survey online. The majority of respondents mailed surveys back (n= 494), while 19 respondents completed the survey online. Data collection focused on regional expenditure information, but trip characteristics and socio-demographic information were also collected. Table A1 presents the descriptive statistics for trip characteristics from the sample.

Table A1: Trip Characteristics per Permit

Variable	Obs.	Mean	Std. Dev.	Min	Max
People on Permit	513	4.19883	2.182906	1	9
Nights in BWCAW	513	3.964912	2.044127	0	16
Nights Spent Adjacent to BWCAW	513	1.395712	1.413295	0	12
Trip Type					
Overnight Paddle	513	.9220273	.2683904	0	1
Day Use Paddle	513	.0623782	.2420772	0	1
Overnight Motor	513	.0019493	.0441511	0	1
Day Use Motor	513	.0136452	.1161263	0	1
Hiking	513	0	0	0	0

The surveys requested trip leaders to fill out information for their entire permit group. Socio-demographic information was asked including where participants lived, whether or not their BWCAW trip was their primary reason for their trip to Northeastern Minnesota, and their household income. Table A2 illustrates trip leader characteristics.

Table A2: Trip Leader Characteristics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Live in the Region	513	.0253411	.1573124	0	1
Do Not Live in the Region	513	.9746589	.1573124	0	1
Primary Reason for Trip	477	.9706499	.1689631	0	1
Not Primary Reason for Trip	477	.0293501	.1689631	0	1
Household Income					
<\$35K	491	.0509165	.2200514	0	1
\$35K--\$50K	491	.0631365	.2434563	0	1
\$50K--\$75K	491	.1608961	.3678099	0	1
\$75K--\$100K	491	.1771894	.3822183	0	1
\$100K--\$150K	491	.2443992	.4301687	0	1
>\$150K	491	.3034623	.460222	0	1

Finally, survey participants were asked about their regional expenditures in 16 spending categories. These sample expenditures were used to estimate total 2016 annual regional final demand in 12 aggregated expenditure categories which was entered into IMPLAN's impact analysis. Table A3 presents the descriptive statistics for expenditures by category.

Table A3: Expenditure Type per Permit

Variable	Obs.	Mean\$	Std. Dev.	Min	Max
Outfitting	513	999.8359	1694.248	0	14300
Lodging	513	224.6189	420.4609	0	4000
Groceries	513	73.40156	103.2202	0	1000
Food and drink	513	147.0166	143.993	0	1000
Flights	513	39.73684	255.4266	0	2589
Rental Vehicles	513	31.70565	178.9173	0	2300
Shuttle Fees	513	20.52632	166.6179	0	2600
Motor Boat Tow-In	513	3.021442	28.47068	0	400
Gas and oil	513	49.81823	50.96703	0	450
Vehicle Repairs	513	3.452242	40.49134	0	859
Retail Boat	513	37.51267	110.9058	0	800
Retail Gear	513	43.07407	221.8104	0	4000
Retail Fish	513	29.65887	82.09447	0	1000
Retail Clothing	513	63.5575	137.3028	0	2000
Fish License	513	42.40156	55.79537	0	312
Miscellaneous	513	55.53996	140.3796	0	2000

Appendix B: Extrapolating Sample Estimates to Annual BWCAW Visitor Expenditures

Stynes et al. (2002) and White et al. (2013) provide helpful considerations for extrapolating expenditure sample estimates to groups of outdoor recreationists in impact analyses and we follow their approach for the construction of our regional expenditures in IMPLAN. The first step was to try to approximate total regional expenditures generated by BWCAW tourism on an annual basis.

Current trend analysis from the Superior National Forest provide visitation estimates from 2010-2015. In 2015, approximately 143,300 people visited the BWCAW. Many of these visitors (60 percent) stayed one or more nights in the BWCAW during the quota summer season. Of the overnight visitors, over 90 percent acquired Overnight Paddle permits. Other types of BWCAW visitors in 2015 include approximately 20,000 Day Use Motor visitors (14 percent of total visitors) and self-issue permit holders (27 percent of total visitors). Self-issue wilderness permit holders are primarily day use paddlers in the summer season and off-season visitors to the BWCAW.

Our survey sample closely matches overall estimates from the Superior National Forest. For example, our sample average group size per permit was 4.2 and the overall average group size per permit in 2015 was 4.0. But due to sampling limitations, our sample is only truly representative of summer permit holders and we are unsure of the spending patterns associated with out of season self-issue permit holders (October—April).

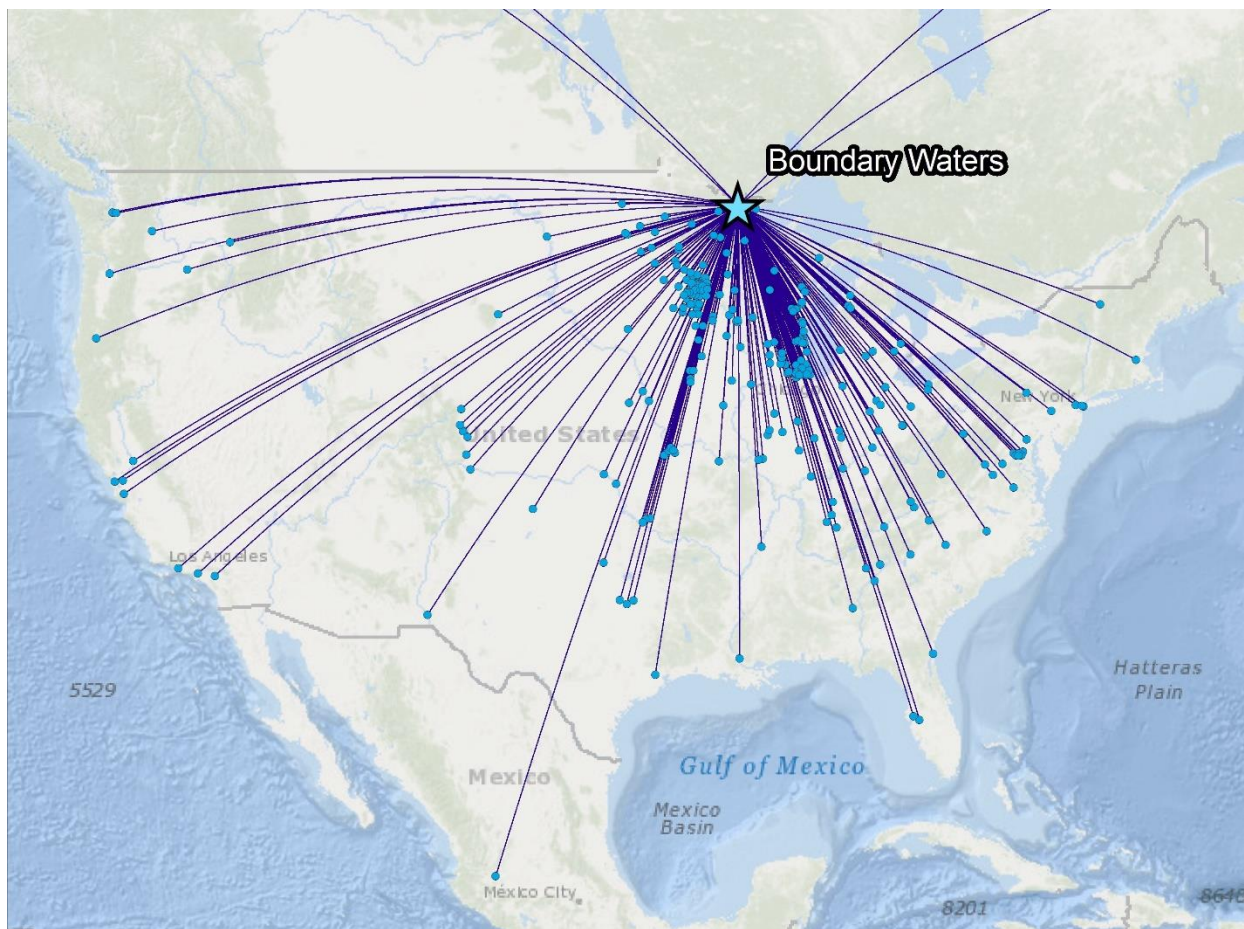
While we know that the estimated 11,600 out-of-season 2015 visitors to the BWCAW also spent money in the adjacent gateway communities, we assume that these visitors include higher rates of locals and lower overall spending patterns. Since we do not have specific expenditure information about these visitors, we conservatively do not include their regional economic impacts in our impact analysis, but we do acknowledge that the total regional spending is a bit greater than our estimates. To estimate total spending we extrapolate our sample averages only to the approximately 131,700 visitors in 2015 that visited between May and September.

Per Stynes et al. (2002), we also need to consider attribution decisions when extrapolating our sample estimates. We are concerned with expenditures from visitors that live outside the regional economic impact zone and with expenditures that we can fully attribute to their visit to the BWCAW. In the survey, more than 97 percent of responses were from respondents that lived outside of the region. In total, 95 percent of the sampled permit holders were from out of the region *and* stated that the BWCAW trip was their primary purpose for their visit to northeastern Minnesota. While non-primary trip spending in the BWCAW still has regional economic impacts, we are unable to fully attribute that spending to BWCAW visitation. So we conservatively do not include this type of spending. Excluding expenditures made by locals and expenditures made by non-primary trip visitors, reduces our annual BWCAW visitor representation to approximately 125,000 visitors ($131,700 \times .95$).

We broadly apply our sample expenditure means to estimated annual summer season visitors (125,000). While the different user groups in the BWCAW in the summer (canoers, motor boaters, hikers) likely have different expenditure patterns, we feel comfortable that our sample adequately captures different users. For example, our sample is composed of about 92 percent Overnight Paddle permit holders, 6 percent Day Use paddle permit holders, and about 2 percent Day Use and Overnight Motor permit holders. Based on the recent BWCAW visitor trend analysis from the SNF, overnight paddlers represent about 76 percent of quota permits, motor use composes about 22 percent of quota permits, and day use paddlers represent about 4 percent of summer season permit holders. Thus, our sample has slight over-representation of Overnight Paddle permit holders, under-representation of Day Use and Overnight Motor permit holders, and similar representation of Day Use Paddle permit holders.

Extrapolating our sample estimates to out-of-region BWCAW summer season visitors is appropriate and likely results in a conservative estimate of overall regional economic impacts. Day Use Motor and Overnight Motor permit holders are under-represented in our sample, but likely have greater regional expenditures than average Overnight Paddle permit holders due to additional equipment and gasoline purchases. In our sample, BWCAW motor boat visitors averaged about 20 percent greater regional expenditures than the rest of the trip types. But, with limited motor boat permit samples, we apply total sample averages to all summer season BWCAW visitors.

Appendix C: BWCAW Visitor Origin Map



*Visitor origins pictured only represent about 2% of BWCAW annual Quota Permits. (n = 505)

**Additional visitor origins from Alaska and Europe are not pictured.