Economic Contribution of the Ski Industry in New Hampshire

The Past Four Seasons

2014/15, 2015/16, 2016/17 and 2017/18

Prepared for Ski New Hampshire

Daniel S. Lee

Plymouth State University

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I. Executive Summary

Visitor count and spending

It was estimated that 2.8 million people visited the ski areas in New Hampshire for recreational purposes during the 2017/18 season, (the season is defined as the period between May 2017 to April 2018; see bottom of Page 8 for further clarification). The visitors were estimated to have spent approximately $384.2 million at and away from ski areas within New Hampshire for tickets/admissions, lodging, restaurant meals, groceries, transportation and others. See Table 2. The ski industry is defined as all these businesses directly supported by the $384.2 million spent by visitors to the State's ski areas.

Total effect

The overall effect of spending by visitors to the state's ski areas is much larger. The direct spending of $384.2 million indirectly supported the supply industries in the state by making purchases from them (indirect effect). Examples of these supply industries include accounting, advertising, and employment services. In addition, workers in the directly and indirectly affected industries spent their earnings in the state's services industries (induced effect), such as grocery stores, hospitals, gas stations, restaurants and utility companies. The total effect of the ski industry (direct + indirect + induced) was estimated to be 7,485 jobs, $200.3 million in labor income, and $507.8 million in economic output during the 2017/18 season. See Table 3.

Total effect in perspectives

The total effect of 7,485 jobs was 0.3 percent of all employment statewide and 0.9 percent of all jobs in the state's northern and western seven counties on an annual basis during the 2017/18 season. The contribution of the ski industry during the winter five-month skiing season is much greater as the ski areas hire more workers in their peak season. During the winter season, 1.3 percent of all employment in these northern and western seven counties would be directly or indirectly dependent on spending by skiing parties.

Contribution to taxes and government receipts

The ski industry also contributes to the state's coffer as well. It was estimated that ski area visitor spending resulted in a total of $36.1 million in state government taxes and fees, which was approximately 0.8 percent of all state government taxes and fees during the 2017/18 season (using the U.S. Census, 2016 State & Local Government Finance). An additional $28.1 million were paid in taxes and fees to the local governments. Table 6 reports detailed information on estimated taxes and government receipts.

Importance of the ski industry in the region

So what does this all mean? It helps to understand the level of contribution that the ski industry makes when we compare the number of jobs by industry. Only direct effect, excluding the indirect and induced effect, is considered for comparison because only direct jobs are publicly available for other industries. It was estimated that the spending of $384.2 million directly

created 5,997 jobs in the 2017/18 season, which would be the fifth largest industry in the state's northern and western seven counties. The impact of skier spending is even greater during the winter five-month skiing season; the direct skier spending created 10,117 jobs, which ranked the ski industry as the fourth largest employer in the state's northern and western seven counties. See Figure 2. The ski industry is one of the largest employer in the region.

Variations in Contribution between worst and best years

This significant level of contribution that the ski industry makes remains high even in low-snowfall years. Despite swings from one year to another due to the weather, the industry has been steadfastly one of the largest employers in the region. For example, the 2015/16 season was one of the worst winters ever: it recorded only 33 days with snow cover, which was the second lowest only to the 2011/12 season since at least the 1996/97 season. It was a near 50% drop in the number of days with snow cover from the prior 2014/15 season. As a result, it was estimated that the number of winter visitor days to the ski areas fell by more than 27 percent. See Table 7. Nevertheless, the ski industry was still the fourth largest employer in the state's northern and western seven counties. In fact, the industry has been invariably a top four employer in the region during the past four winter ski seasons regardless of the weather. See Figure 3. This speaks volumes about the importance of the ski industry to the regional economy.

Winter versus summer

The seasonal nature of the ski business is one of the greatest challenges to the industry. In their efforts to overcome the seasonality, the state's ski areas have recently made significant investment to attract visitors during the non-skiing summer and fall seasons. These visitors rode on tramways and ski lifts, went mountain biking and ziplining, and attended concerts and other events at the ski areas. As a result, it was estimated that the number of visitor days to the ski areas during the non-skiing seasons had increased by more than 71% to 701,083 in the 2017/18 season from 408,469 in the 2009/10 season (Table 7). The share of summer and fall visitors in yearly total has steadily increased over the past decade, making up nearly a quarter of the yearly total in the 2017/18 season. See Figure 4.

The ski industry's investment in summer operations increases the its viability in facing climate change. Not only does it help diversify revenue sources of the ski areas but it also helps mitigate the negative impacts of a low-snowfall winter. For example, the 2015/16 season suffered a 27% drop in winter visitor days from the prior season but, as the yearly total, the drop was only 20.9% after taking into account summer and fall visitors. In the 2015/16 season, the share of summer visitors in the yearly total reached its highest level at more than 28%.

How does this report differ from past ones?

This study is not directly comparable to the past studies authored by the Institute for New Hampshire Studies (INHS) on the economic contribution of the ski industry in New Hampshire due to changes in the methodology and data. This topic is discussed in detail at the end of the document.

Summary

In short, the importance of the contribution that the ski industry makes to the state's economy cannot be emphasized enough. Its contribution is particularly important for the northern and western regions of the state. The number of jobs created by skier spending at and away from the ski areas ranks the industry as the fifth largest in the northern and western counties during the past four years, regardless of the weather. The magnitude of the ski industry's contribution is reflected in the national statistics as well. The U.S. Census Bureau reports that, in terms of ski areas revenue per resident, New Hampshire ranks the fourth highest after Vermont, Colorado, and Utah in 2012. Furthermore, the ski industry fuels economic growth in the state by bringing money from outside the state. This is particularly important for the northern regions of the state that lack industrial bases other than the tourism sector. The National Ski Areas Association (NSAA) survey shows that 69 percent of the skiers during the 2017/18 skiing season were non-residents. The non-resident share in spending is likely even higher since non-residents are more likely to stay overnight and spend more. The NSAA survey reported that 89 percent of overnight skiers during the 2017/18 skiing season were from outside of the state.

II. Project Description

Plymouth State University was contracted by Ski New Hampshire, the state's non-profit, member-based, ski industry trade association, to estimate the economic contribution of the ski industry to New Hampshire's economy over four recent consecutive skiing seasons: the 2014/15, 2015/16, 2016/17, and 2017/18 seasons.

A survey was distributed to Alpine and Nordic ski areas in New Hampshire to collect detailed industry data, including visitor counts and visitor spending at the ski areas. Table 1 below lists all 29 ski areas that were included in the study. Of the 29 ski areas, 17 participated in the 2017/18 survey while the other 12 did not. These 12 ski areas were mainly small Nordic-only ski areas. Statistical models were built to impute their values using all available information, including historical industry survey data (from Plymouth State University) and weather data on snowfalls and rainfalls (from the National Oceanic and Atmospheric Administration).

Visitor spending at and away from the ski areas was estimated based on visitor counts and lift ticket sales (from the New Hampshire ski areas surveys), skiers demographic and economic data (from the National Ski Areas Association survey), and outdoor recreational visitor spending by activity and visitor type (from the U.S. Forest Service's National Visitor Use Monitoring Program). See Table 2 below for the spending estimates by spending category.

An input-output IMPLAN model was created to measure the multiplier effect of the ski areas visitor spending in the rest of the economy. The ski industry made a significant contribution to the state's economy given that they purchased their supplies and services from local businesses, including accounting, advertising, and employment services. In addition, spending by workers in the ski industry and its supply industries provided a boost to the region's economy.

Table 1. List of Ski Areas in the Study

Ski Area	Travel Region	2017/18 survey participant?
Abenaki Ski Area	Lakes	no
Attitash Mountain Resort	White Mountain	yes
Bear Notch Ski Touring Center	White Mountain	no
Black Mountain	White Mountain	no
Bretton Woods	White Mountain	yes
Cannon Mountain	White Mountain	yes
Cranmore Mountain Resort	White Mountain	yes
Crotched Mountain	Monadnock	yes
Dartmouth Skiway	Dartmouth Lakes Sunapee	yes
Eastman Cross Country	Dartmouth Lakes Sunapee	yes
Franconia Village XC Ski Center	White Mountain	no
Granite Gorge	Monadnock	no
Great Glen Trails	White Mountain	yes
Gunstock Mountain Resort	Lakes	yes

Jackson Ski Touring Foundation	White Mountain	yes
King Pine at Purity Spring Resort	Lakes	yes
Loon Mountain Resort	White Mountain	yes
McIntyre Ski Area	Merrimack Valley	no
Mount Sunapee	Dartmouth Lakes Sunapee	yes
Mt. Washington Valley Ski Touring	White Mountain	no
Nordic Skier Wolfeboro	Lakes	no
Norsk Cross Country Ski Center	Dartmouth Lakes Sunapee	no
Pats Peak	Dartmouth Lakes Sunapee	yes
Pine Hill Ski Club New London	Dartmouth Lakes Sunapee	no
Ragged Mountain Resort	Dartmouth Lakes Sunapee	yes
Waterville Valley Resort	White Mountain	yes
Whaleback Mountain	Dartmouth Lakes Sunapee	no
Wildcat Mountain	White Mountain	yes
Windblown XC	Monadnock	no

III. Definitions of Key Measures

1. **Employment:** means the annual average number of jobs, including both full- and part-time jobs; for example, 10 jobs for the first half of the year and 20 jobs in the second half results in 15 average jobs for the year.
2. **Labor income:** means employee compensation (wages and salaries plus other compensations) and proprietor income.
3. **Value added:** means labor income, other types of property income (such as dividends, interest income, rent income, and profits), taxes on production and imports.
4. **Output:** means the total value of production, which is the sum of value added and the cost of all the inter-industry purchases required for production.
5. **Multiplier effect:** means the cumulative economic activity arising from the fact that the ski industry's contribution spreads across the state's economy by creating and supporting jobs, incomes, and taxes. The ski industry supports its supply industries in the region by making purchases from them (indirect effect). These supply industries include marketing, real estate, employment services, and maintenance and repair construction. In addition, workers in the ski industry and its supply industries spend their earnings in the region's services industries (induced effect), such as restaurants, hospitals, grocery stores, and gas stations.
6. **Direct effect:** means jobs, incomes, and taxes directly created by the ski industry or ski areas visitor spending at and away from the ski areas.
7. **Indirect effect:** means the economic effects of local inter-industry (supply industries, such as marketing services) spending due to the existence of the ski industry.
8. **Induced effect:** means the economic effects of local spending (usually in services industries) of employee's wages and salaries of the directly and indirectly affected industries.

IV. IMPLAN Model and Data

The model used in this analysis was built by customizing the Impact Analysis for Planning (IMPLAN) regional input-output software. The first input-output model was developed by Dr. Wassily Leontieff to help the United States mobilize to meet the demand of World War II. For his work on input-output models, he won the Nobel Prize in Economic Science in 1973.

The input-output model was later applied to regional economies. With the enactment of the National Forest Management Act in 1976, the U.S. National Forest Services needed a systematic tool for evaluating the national forest management plans on local residents and businesses. Hence, the creation of the IMPLAN. The advancement of computer technologies made it possible to extrapolate, extend, and convert existing data to regional economies using non-survey methods, without the cost of onsite data collection.

Today, IMPLAN is widely used for evaluating economic impacts beyond the forest and logging sector. It traces impacts through direct, indirect and induced economic effects. Direct effect is the initial expenditures, or production, made by the industry experiencing the economic change; indirect effect represents the effects of local inter-industry spending through the backward linkages; and induced effect is the results of local spending of employee's wages and salaries for

both employees of the directly affected industry, and the employees of the indirectly affected industries. “Backward linkages” are the tracking of industry purchases backwards through the supply chain to the direct effect industry.

IMPLAN data is constructed primarily from federal government data, including:

- U.S. Bureau of Economic Analysis Benchmark I/O Accounts of the U.S.
- U.S. Bureau of Economic Analysis Output estimates
- U.S. Bureau of Economic Analysis REIS Program
- U.S. Bureau of Labor Statistics Covered Employment and Wages Program
- U.S. Bureau of Labor Statistics Consumer Expenditure Survey
- U.S. Census Bureau County Business Patterns program
- U.S. Census Bureau Decennial Census and Population Surveys
- U.S. Census Bureau Economic Censuses and Surveys
- U.S. Department of Agriculture Crop and Livestock Statistics
- U.S. Geological Survey

V. Model Assumptions

All usual assumptions of the input-output model apply in this study. The model incorporates the following:

- Constant returns to scale
    - As all inputs increase by a factor, output increases by the same factor. For example, output doubles if all inputs double.
- National production coefficients and margins
    - An industry is assumed to have identical production functions and margins in all regions in the country.
- No substitution among inputs
    - No substitution among inputs is assumed for simplicity. In practice, firms may look for an alternative for an input that becomes increasingly more expensive, which may happen if its demand increases and/or its supply falls.
- No constraints to the supply of commodity

VI. How Much Do Skiers Spend in New Hampshire?

Visitors to the state's ski areas not only pay for tickets/admissions but also spend at lodging facilities, restaurants, gas stations, and grocery stores. Table 2 shows breakouts of visitor spending by category and season during the 2017/18 season. The largest item was tickets/admissions, making up more than 30 percent of the total spending. It was followed by spending on restaurant meals (20.4 percent) and travel costs (17.6 percent). However, the true proportion of travel costs is likely to be lower in New Hampshire than estimated as the breakouts are calculated by the national averages. A vast majority of visitors drive to New Hampshire from nearby New England states. On the other hand, the proportion of retail spending is likely to be higher than estimated, as visitors to New Hampshire tend to spend more than the national average in retail shopping to take advantage of no sales tax in the state.

Table 2. Ski Travel Party Spending, 2017/18

	Ski Season (millions of dollars)	Non-Ski Season (millions of dollars)	Total (millions of dollars)	Total (percent)
Tickets/admissions	$106.1	$11.0	$117.1	30.5%
Restaurants	$59.4	$19.1	$78.4	20.4%
Travel costs	$38.4	$29.3	$67.6	17.6%
Lodging	$40.5	$17.3	$57.8	15.0%
Grocery stores	$19.7	$20.8	$40.5	10.5%
Retail	$14.9	$7.9	$22.7	5.9%
Total	$278.8	$105.4	$384.2	100.0%

Source: Estimated by the author based on the New Hampshire ski areas surveys, the National Ski Area Association (NSAA) surveys, the U.S. National Forest's National Visitor Use Monitoring (NVUM) program, and the National Oceanic and Atmospheric Administration (NOAA)

To estimate visitor spending at and away from the ski areas, the author:

- Took lift ticket sales at Alpine ski areas from the New Hampshire ski areas surveys;
- Aggregated lift ticket sales and then grouped it into four trip types: 1) local day trips, 2) local overnight trips, 3) non-local day trips, and 4) non-local overnight trips (The NSAA survey reported the proportions of the four-trip types);
- Divided the lift ticket sales by the ratio of lift ticket sales in total spending (The NVUM reported visitor spending by spending category, by activity type, and by trip types), in order to estimate visitor spending at and away from the ski areas per trip type;
- Repeated the above steps to estimate spending by Nordic skiers;
- Aggregated spending by Alpine and Nordic skiers for the total winter visitor spending; and
- Estimated summer visitor spending in the same manner.

A season is a period from a May to the following April. For example, the 2017/18 season is the period of May 2017-April 2018. The ski season is the winter five-month period from a December to the following April (i.e., the 2017/18 ski season is December 2017 - April 2018). The non-ski season is from a May to the following November (i.e., the 2017/18 non-ski season is May - November of 2017).

VII. Total Effect of Visitor Spending, 2017/18

The total effect of spending by visitors to the ski areas was estimated based on the IMPLAN model with actual data from the ski areas. Visitors to the state's ski areas directly spent at lodging facilities, restaurants, gas stations, grocery stores, and other retail. Their spending indirectly supported their supply industries in the state by making purchases from them (indirect effect). In addition, workers in the directly and indirectly affected industries spent their earnings in the state's services industries (induced effect). For example, Table 3 shows that there were 5,997 jobs in the directly affected industries. These 5,997 directly affected jobs supported an additional 566 jobs in supporting industries, such as accounting, advertising, and employment services. These 5,997 directly affected jobs and 566 jobs in the supporting industries together supported an additional 923 jobs in services industries, such as grocery stores, hospitals, gas stations, restaurants and utility companies.

Table 3. Summary of Economic Contribution, 2017/18

Impact Type	Employment	Labor Income (millions of dollars)	Value Added (millions of dollars)	Output (millions of dollars)
Direct Effect	5,997	$124.4	$175.4	$285.2
Indirect Effect	566	$30.7	$57.3	$94.6
Induced Effect	923	$45.2	$78.1	$128.0
Total Effect	7,485	$200.3	$310.8	$507.8

Note: Value added is the sum of labor income, other types of property income (such as dividends, interest income, rent income, and profits), and taxes on production and imports. Output is the sum of value added and the cost of all the inter-industry purchases required for production.

Table 4 shows the top 25 industries supported by the ski industry in terms of employment. The industry's greatest employment contribution was to "Other amusement and recreation industries" with 3,381 jobs, followed by "Full-service restaurants" with 1,608.

Table 4. Top 25 Industries Affected, Employment, 2017/18

Sector	Description 2018	Direct	Indirect	Induced	Total
0	Total	5,997	566	923	7,485
496	Other amusement and recreation industries	3,373	2	7	3,381
501	Full-service restaurants	1,541	13	54	1,608
499	Hotels and motels, including casino hotels	418	1	1	420
400	Retail - Food and beverage stores	201	1	38	239
402	Retail - Gasoline stores	157	2	8	167
406	Retail - Miscellaneous store retailers	128	4	16	148
440	Real estate	0	100	47	146
404	Retail - Sporting goods, hobby, musical instrument and book stores	101	2	7	110
500	Other accommodations	67	0	0	67
482	Hospitals	0	0	49	49
395	Wholesale trade	0	22	26	48
502	Limited-service restaurants	0	6	41	47
464	Employment services	0	26	11	37
468	Services to buildings	0	24	13	37
503	All other food and drinking places	0	14	22	36
461	Management of companies and enterprises	0	28	6	34
405	Retail - General merchandise stores	0	2	31	34
475	Offices of physicians	0	0	27	27
62	Maintenance and repair construction of nonresidential structures	0	19	6	25
474	Other educational services	0	9	15	24
448	Accounting, tax preparation, bookkeeping, and payroll services	0	16	6	22
504	Automotive repair and maintenance, except car washes	0	6	16	21
485	Individual and family services	0	0	19	19
412	Transit and ground passenger transportation	10	3	6	19

Table 5 shows the top 25 industries supported by the ski industry in terms of labor income. Its greatest labor income contribution was to "Other amusement and recreation industries" with $50.9 million, followed by "Full-service restaurants" with $41.9 million.

Table 5. Top 25 Industries Affected, Labor Income, 2017/18

Sector	Description 2018	Direct	Indirect	Induced	Total
0	Total	$124,399	$30,665	$45,249	$200,313
496	Other amusement and recreation industries	$50,667	$45	$185	$50,898
501	Full-service restaurants	$40,127	$346	$1,399	$41,871
499	Hotels and motels, including casino hotels	$14,522	$44	$23	$14,589
400	Retail - Food and beverage stores	$5,307	$18	$994	$6,318
402	Retail - Gasoline stores	$5,375	$60	$284	$5,719
395	Wholesale trade	$0	$2,189	$2,619	$4,808
482	Hospitals	$0	$0	$3,667	$3,667
406	Retail - Miscellaneous store retailers	$2,941	$94	$365	$3,400
475	Offices of physicians	$0	$0	$3,338	$3,338
404	Retail - Sporting goods, hobby, musical instrument and book stores	$2,980	$45	$210	$3,235
461	Management of companies and enterprises	$0	$2,567	$519	$3,086
440	Real estate	$0	$1,802	$844	$2,646
500	Other accommodations	$2,163	$1	$2	$2,167
437	Insurance carriers	$0	$810	$1,009	$1,819
464	Employment services	$0	$1,234	$550	$1,784
448	Accounting, tax preparation, bookkeeping, and payroll services	$0	$1,165	$475	$1,640
62	Maintenance and repair construction of nonresidential structures	$0	$1,234	$402	$1,636
435	Securities and commodity contracts intermediation and brokerage	$0	$537	$956	$1,494
454	Management consulting services	$0	$1,039	$449	$1,488
504	Automotive repair and maintenance, except car washes	$0	$364	$1,045	$1,409
518	Postal service	$0	$1,009	$233	$1,242
449	Architectural, engineering, and related services	$0	$925	$307	$1,231
503	All other food and drinking places	$0	$426	$658	$1,083
434	Nondepository credit intermediation and related activities	$0	$594	$474	$1,068

Note: Dollar amounts are expressed in thousands of dollars.

Table 6 shows the state and local government taxes and receipts the ski industry contributed. It collectively generated $64.2 million of tax and other revenues to New Hampshire's state and local governments from all sources (direct, indirect and induced effect).

Table 6. State and Local Government Tax and Fee Receipts, 2017/2018

Source, in thousands	2017/18
Rooms and Meals Tax	$14,469
Business Tax	$3,289
State Liquor Store Sales	$2,800
Tolls and Gas Tax	$1,237
Tobacco and Beer Tax	$999
Parks and Recreation	$90
Other State Taxes and Fees	$13,198
Total State Government	$36,080
Local Government Taxes and Fees	$28,095
Total State and Local Government	$64,176

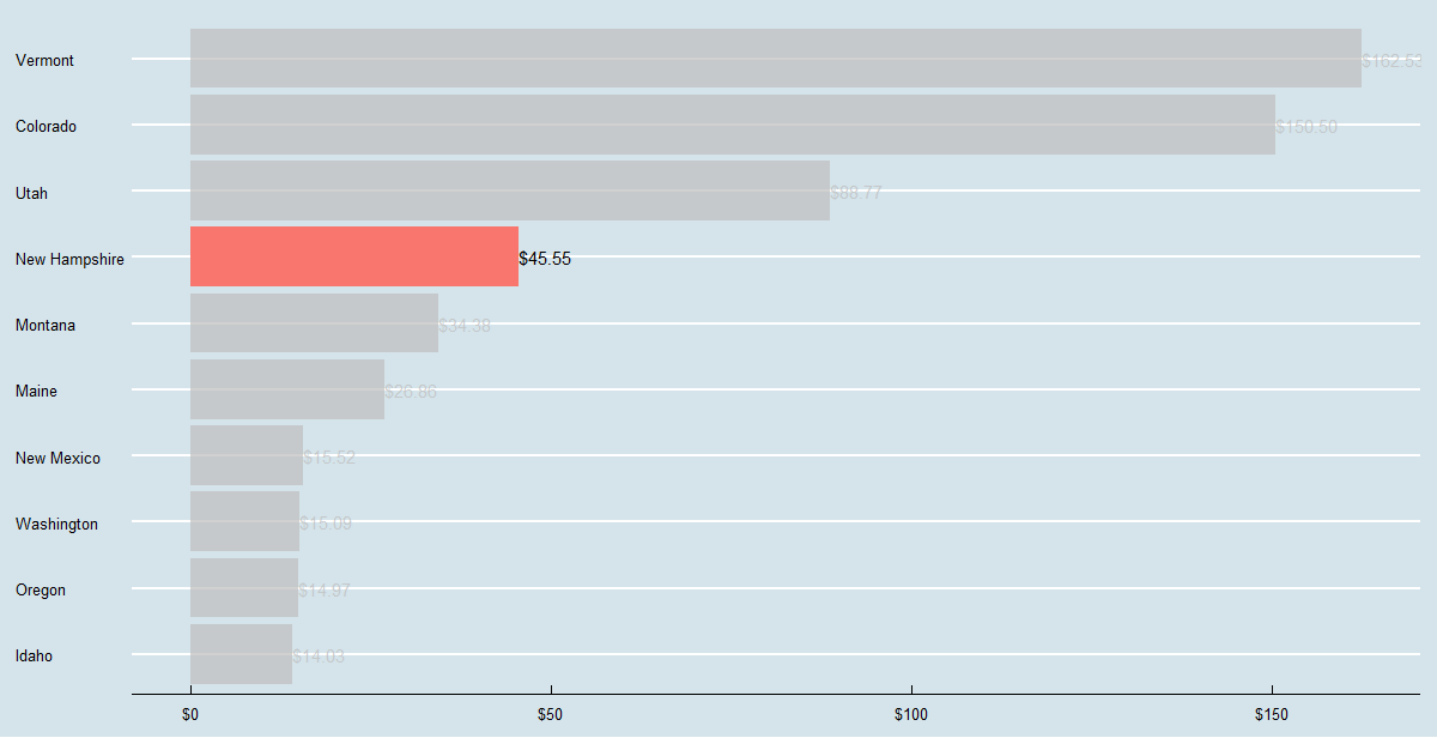
Note: Dollar amounts are shown in thousands of fiscal year 2018 dollars. Other State Taxes and Fees include telecommunications, banking, insurance, utility consumption tax, utility property tax, state property tax, and real estate transaction taxes and fees.

VIII. The Ski Industry Is an Economic Engine of the Region

The ski industry plays a critical role in New Hampshire's economy. According to the U.S. Census Bureau, New Hampshire ranks fourth in the country only after Vermont, Colorado and Utah in terms of ski area revenue per resident (total ski area revenue divided by state's population) in 2012. Visitors were estimated to have spent more than $45 per resident at the state's ski areas.

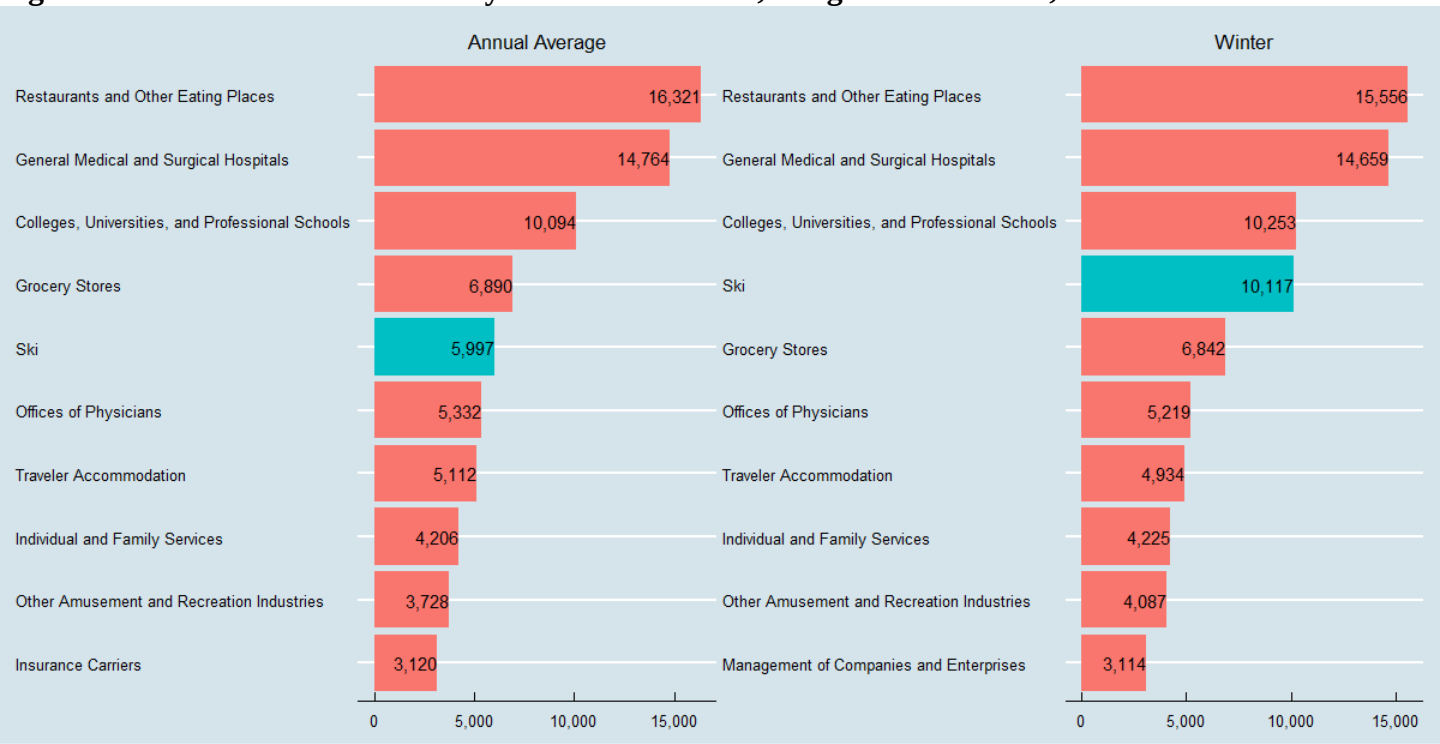
The data represents ski facilities without accommodations (NAICS: 71392). This data only includes 13 New Hampshire ski facilities without accommodations (there are 29 ski areas in the state, some of which have accommodations) and does not include their spending away from the ski facilities within the state.

Figure 1. Ski Area Sales per Resident, 2012



Source: U.S. Census Bureau: Economic Census 2012

Figure 2. Direct Jobs in Ski Industry Relative to Others, 4-digit NAICS Code, 2017/18



Source: The U.S. Census Bureau (Quarterly Workforce Indicators), the New Hampshire Ski Areas Survey, the U.S. National Forest's National Visitor Use Monitoring (NVUM) program, and the National Oceanic, Atmospheric Administration (NOAA), and IMPLAN

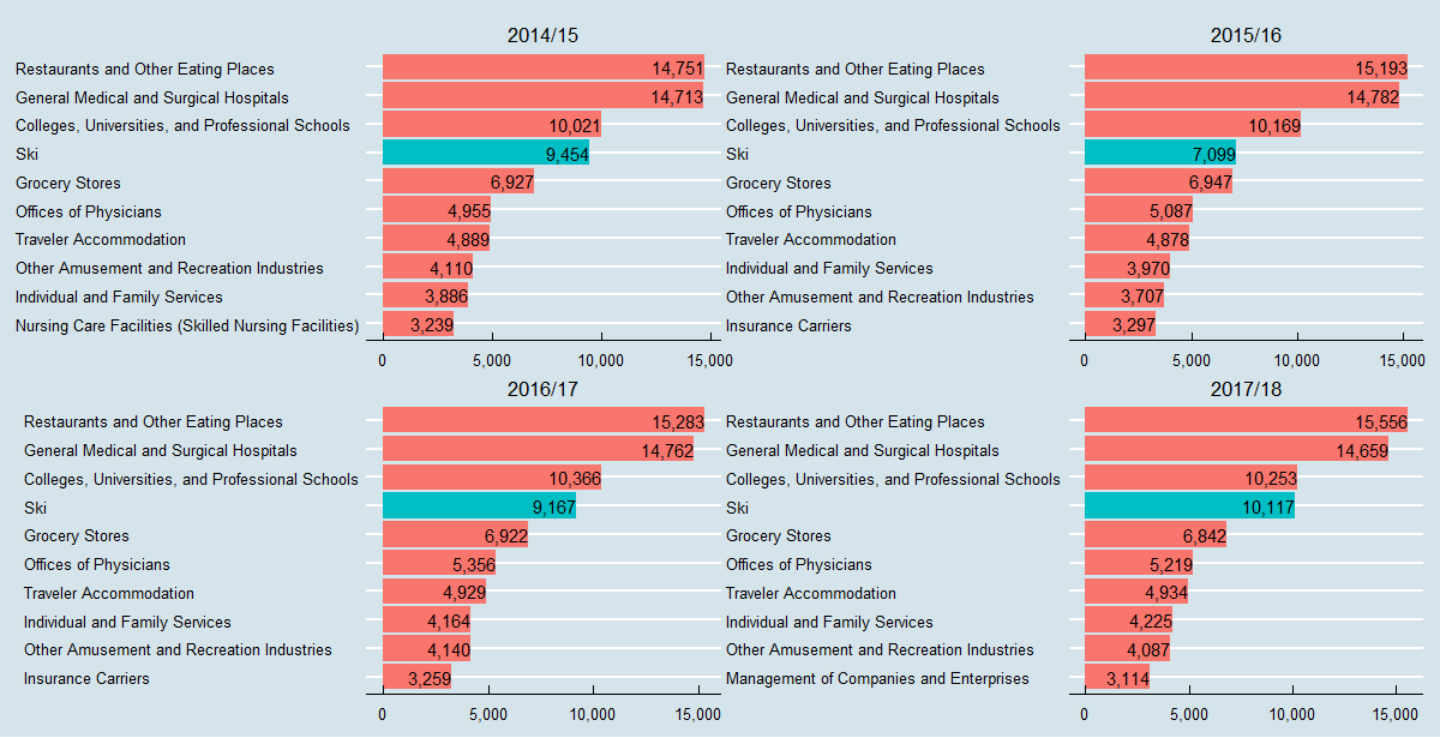
The ski industry is one of the largest employers in the region. During the 2017/18 season, for example, it was the fifth largest employer in the state's northern and western seven counties on annual average and the fourth largest during the winter five months. The ski industry hired more than 10,000 employees during the winter five months and nearly 6,000 on an annual average. Understandably, the seasonal swings present challenges, such as securing quality employees only on a part-time and seasonal basis every year. However, it also means that there is room for growth by expanding business into the non-skiing summer and fall season. This topic is discussed more in detail in Section IX.

In addition, this significant level of employment contribution that the ski industry makes remains high even in low-snowfall years. Despite swings from one year to another due to the weather, the industry has been steadfastly one of the largest employers in the region. For example, the 2015/16 season was one of the worst winters for the state's ski areas; it recorded only 33 days with snow cover, which was the second lowest only to the 2011/12 season since at least the 1996/97 season. It was a near 50% drop in the number of days with snow cover from the prior 2014/15 season. As a result, it was estimated that the number of winter visitor days to the ski areas fell by more than 27 percent. See Table 7. Nevertheless, the ski industry was still the fourth largest employer in the state's northern and western seven counties. In fact, the industry has been invariably a top four employer in the region during the past four winter ski seasons regardless of the weather. See Figure 3.

The number of jobs in the ski industry in Figures 2 and 3 represents only direct jobs created by skier spending at and away from the ski areas, including jobs in restaurants, traveler accommodation, grocery stores and gas stations. The author estimated the number of jobs in the ski industry based on data from the

New Hampshire Ski Areas Surveys and the National Oceanic and Atmospheric Administration. On the other hand, the number of jobs in other industries were obtained from the U.S. Census Bureau, the Quarterly Workforce Indicators for the state's northern and western seven counties (that is, the state of New Hampshire less Strafford, Rockingham, and Hillsborough Counties). Only one ski area in this study, McIntyre Ski Area, is located in the aforementioned three-county area. The quarterly data was aggregated to yearly data so that it matches the ski season as closely as possible. For example, the jobs data for the 2014/15 season is the sum of the values from the second quarter of 2014 to the first quarter of 2015.

Figure 3. Direct Jobs in Ski Industry Relative to Others, 4-digit NAICS Code, Winters of 2014/15 – 2017/18



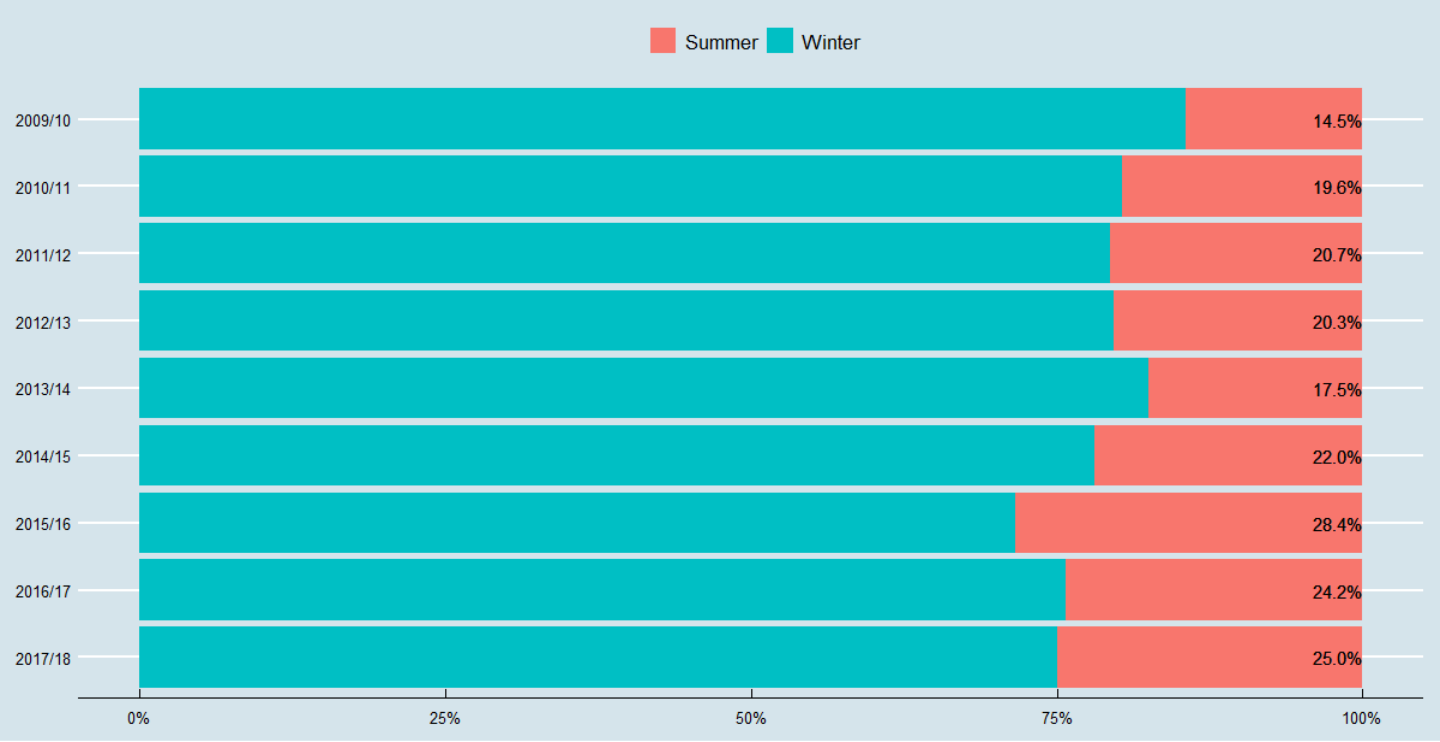
Source: The U.S. Census Bureau (Quarterly Workforce Indicators), the New Hampshire Ski Areas Survey, the U.S. National Forest's National Visitor Use Monitoring (NVUM) program, and the National Oceanic, Atmospheric Administration (NOAA), and IMPLAN

IX. The Ski Industry as Year Round Impacts

The state's ski areas have recently made significant investments to attract visitors during the non-skiing summer and fall season. These visitors rode on tramways and ski lifts for scenic rides, went mountain biking and ziplining, attended concerts and other events at the ski areas, and more. As a result, it was estimated that the number of visitor days to the ski areas had increased by more than 71% to 701,083 in the 2017/18 season from 408,469 in the 2009/10 season. The share of summer visitors in yearly total had steadily increased over the past decade, making up nearly a quarter of the yearly total in the 2017/18 season.

The ski industry's investment in summer operations increases the industry's viability in the face of climate change. It not only helps diversify revenue sources of the ski areas but also helps mitigate the negative impacts of low-snowfall winters. For example, the 2015/16 season suffered a 27% drop in winter visitor days from the prior season but, as the yearly total, the drop was only 20.9% after taking into account the non-skiing summer and fall season. In the 2015/16 season, the share of summer visitors in the yearly total reached its highest level at more than 28%.

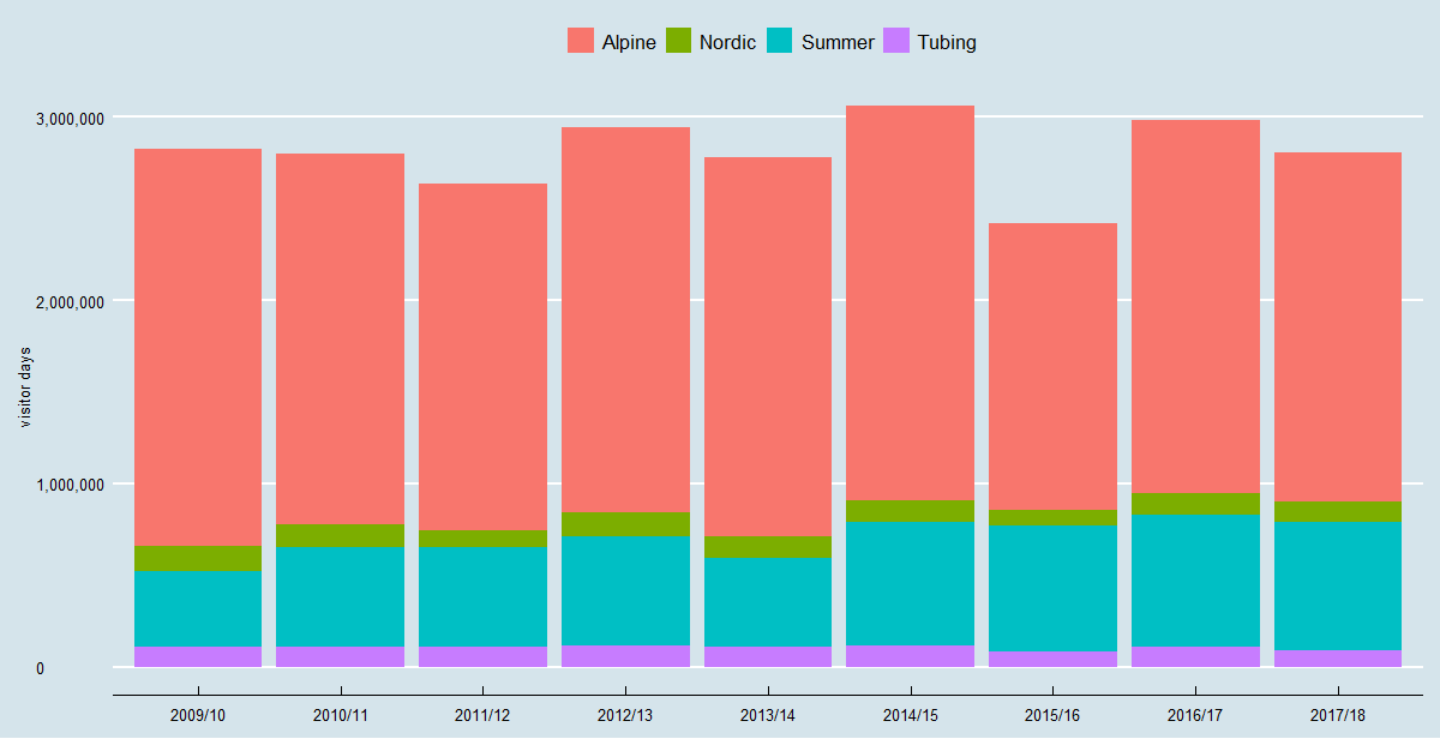
Figure 4. Share of Summer/Fall Visitors to New Hampshire Ski Areas, 2009/10 – 2017/18



Source: Estimated by the author based on data from the New Hampshire Ski Areas Surveys and the National Oceanic and Atmospheric Administration.

The overall yearly visitor days have been largely steady in the past decade without a clear upward or downward trend, ranging from 2.4 million days in the 2015/16 season and 3.1 million days in the 2014/15 season. Increasing summer visitor days have offset decreasing winter visitor days, resulting in steady yearly overall numbers. Summer visitors increased in recent years to nearly 30% of the yearly total. See Figure 5. Alpine skiers and snowboarders remain by far the most significant skier type to the State.

Figure 5. Visitor Days by Type, 2009/10 - 2017/18



Source: Estimated by the author based on data from the New Hampshire Ski Areas Surveys and the National Oceanic and Atmospheric Administration.

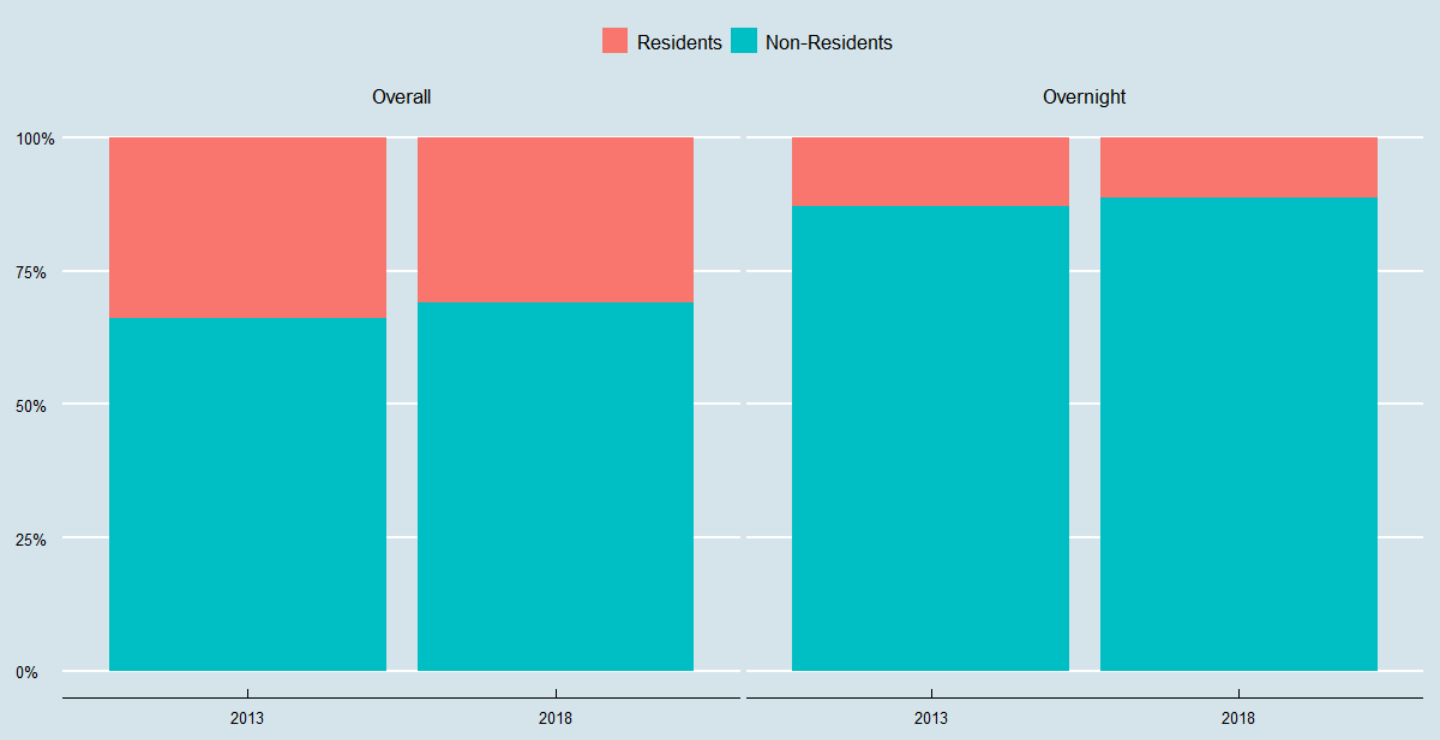
Table 7. Visitor Days by Type, 2009/10-2017/18

Season	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Alpine	2,167,652	2,023,671	1,891,232	2,105,004	2,063,574	2,153,754	1,562,325	2,033,630	1,908,947
Nordic	138,930	120,009	93,104	124,873	120,998	117,598	85,914	118,380	106,222
Tubing	110,513	105,395	105,729	115,644	106,306	115,667	83,888	107,489	90,162
Summer	408,469	549,163	544,958	598,330	485,881	671,383	686,348	723,066	701,083
Total	2,825,564	2,798,238	2,635,022	2,943,851	2,776,759	3,058,402	2,418,474	2,982,565	2,806,414

X. The Ski Industry Brings Money from Outside the State

Another highlight of the ski industry is the fact that a vast majority of skier spending comes from outside of the state. According to the NSAA surveys, for example, 69 percent of skiers came from outside of the state during the 2017/18 season. The share of non-residents is even greater for overnight skiers: 89 percent of overnight skiers reported to be from outside the state. It suggests that skier spending largely came from non-NH residents. The non-resident share of skiers appears to be increasing as well. The NSAA surveys show that the share of non-resident skiers was slightly up for both overall and overnight skiers in the 2017/18 season from the 2012/13 season. The ski industry is an economic engine for the region as money that it brings from outside of the state fuels the regional economic growth.

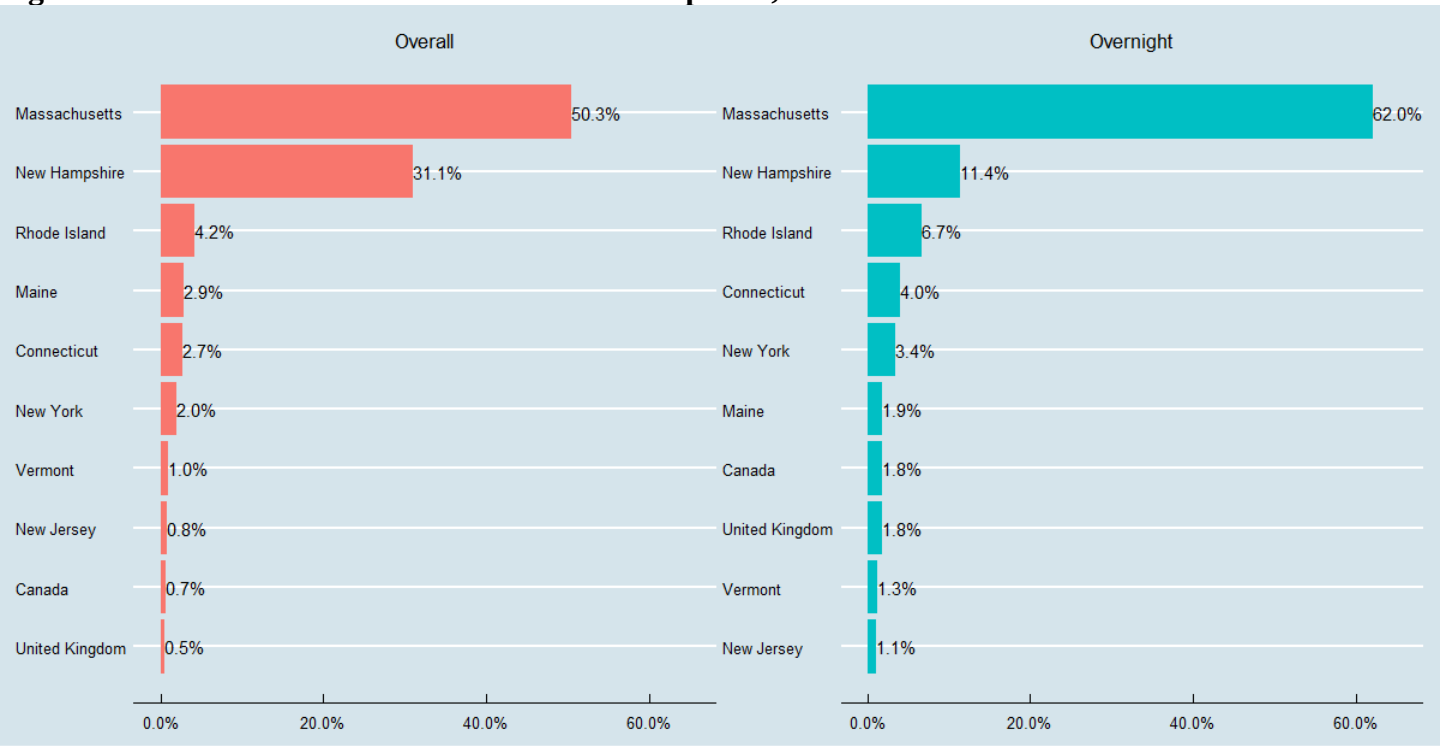
Figure 6. Share of Non-Resident Skiers



Source: National Ski Areas Association Surveys

Figure 7 breaks down skiers by state of origin. A majority of skiers to the state come from Massachusetts. In the 2017/18 season, for example, half of all skiers to the state came from Massachusetts. The proportion of Massachusetts was even higher in overnight skiers, making up more than 60% of the total. The share of New Hampshire residents in overnight skiers was slightly higher than 10%. Although New Hampshire's major skier markets are nearly all New England states, they attract skiers from overseas as well. Canada and United Kingdom, for example, ranked seventh and eighth respectively in overnight skiers during the 2017/18 season. Understandably, greater proportions of overnight skiers came from more distant states or foreign countries.

Figure 7. State of Residence of Skiers in New Hampshire, 2017/18



Source: National Ski Areas Association Survey, 2017/18

XI. The Ski Industry versus Weather

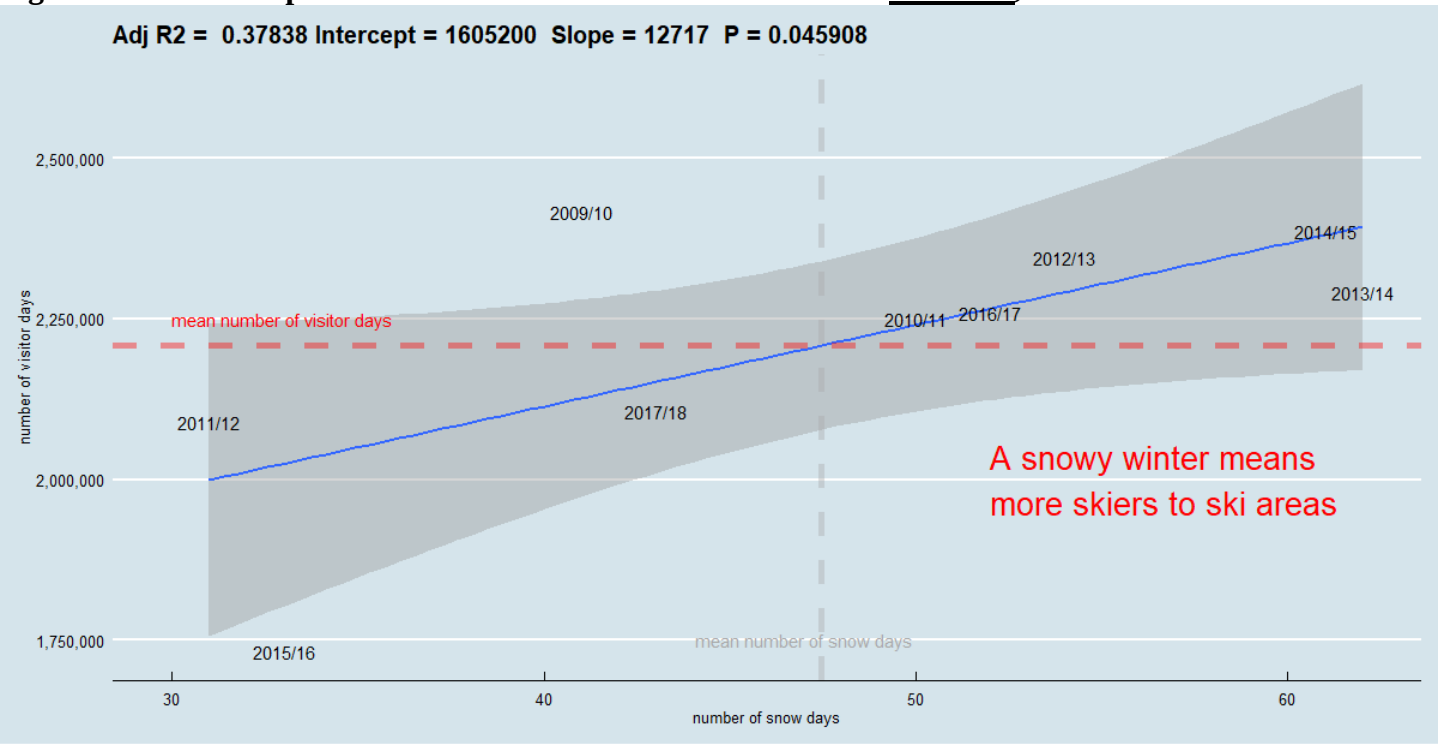
The weather plays a critical role in determining a good or bad year for the ski industry. A snowy winter means more skiers to the ski areas, while a rainy summer brings fewer visitors.

In Figure 8, data points cluster in the upper-right and lower-left pane, illustrating the strong positive association between winter visitor days and snowfalls. The upper-right pane represents seasons with a greater-than-average number of both snow and winter visitor days. Season 2010/11, 2012/13, 2013/14, 2014/15 and 2016/17 fall into this category. The lower-left pane has seasons with a below-average number of both snow and winter visitor days. Season 2011/12, 2015/16 and 2017/18 fall into this category. Season 2009/10 was an outlier. It had a below-average number of snow days but a greater-than-average number of winter visitor days. It shows that, although the number of snow days is an important determinant, it is not the only one. Another determinant can be when it snows – mid week snowfall can impact visits differently than weekend snowfall, and snowfall during key travel times is an important factor to visitation as well. In addition, economic conditions may also be an important variable.

The adjusted R-squared of 0.3784 indicates that snowfalls alone explain nearly 38% of variations in winter visitor days. The slope is statistically significant at 5% and indicates that one additional snow day is associated with an increase of 12,717 winter visitor days to the state.

The blue line is the regression line, the vertical, gray dashed line represents the annual average number of snow days in New Hampshire since the 2009/10 season, and the horizontal red dashed line depicts the annual average number of winter visitor days. A snow day is a day that Concord, New Hampshire, had more than 0.01 inch of snow.

Figure 8. Relationship between Weather and Number of Visitors *in Winter*, 2009/10 – 2017/18



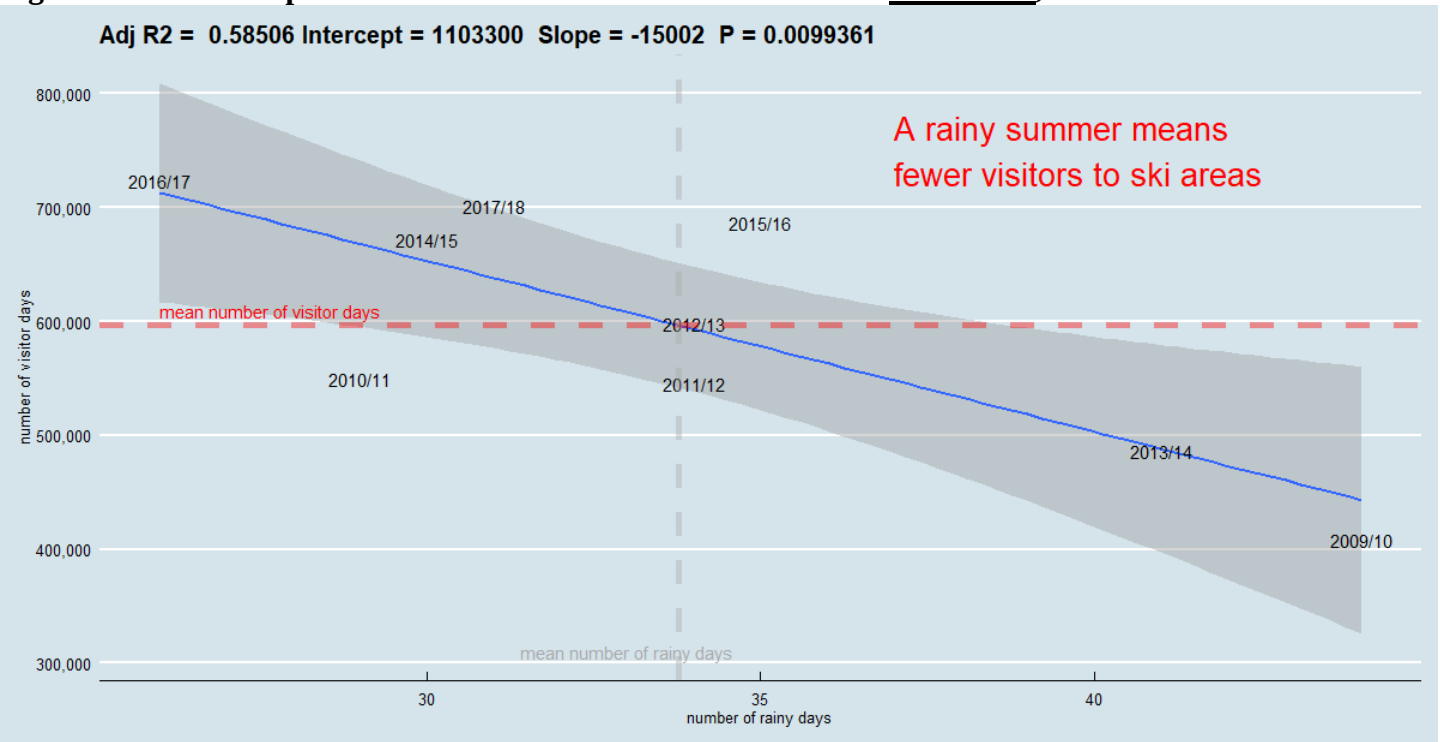
Source: Estimated by the author based on data from the New Hampshire Ski Areas Surveys and the National Oceanic and Atmospheric Administration.

In Figure 9, data points cluster in the upper-left and lower-right pane, illustrating the strong negative association between summer/fall visitor days and rainfalls. The upper-left pane represents seasons with a below-average number of rainy days and a greater-than-average number of summer/fall visitor days. Seasons 2014/15, 2016/17 and 2017/18 fall into this category. Note that the season represents May through the following April; for example, the summer/fall of the 2014/15 season is summer and fall of calendar year 2014. The lower-right pane has seasons with a greater-than-average number of rainy days and a below-average number of summer/fall visitor days. Seasons 2009/10, 2011/12 and 2013/14 fall into this category. Seasons 2010/11 and 2015/16 were outliers. The 2015/16 season, for example, had a greater-than-average number of rainy days but a greater-than-average number of summer/fall visitor days. It shows that, although the number of rainy days is an important determinant, it is not the only one. Another determinant can be when it rains – during the mid-week days it has less of an impact than if it rains on the weekend. In addition, economic conditions may be another determinant.

The adjusted R-squared of 0.58506 indicates that rainfalls alone explain nearly 59% of variations in summer/fall visitor days. The slope is highly significant at 1% and indicates that one additional rainy day is associated with a decrease of 15,002 summer visitor days to the ski areas.

The blue line is the regression line, the vertical, grey dashed line represents the annual average number of rainy days in New Hampshire since the 2009/10 season, and the horizontal, red dashed line depicts the annual average number of summer/fall visitors. A rainy day is a day that Concord, New Hampshire, had more than a trace of rain.

Figure 9. Relationship between Weather and Number of Visitors *in Summer*, 2009/10 – 2017/18



Source: Estimated by the author based on data from the New Hampshire Ski Areas Surveys and the National Oceanic and Atmospheric Administration.

XII. Visitor Spending per Person per Day during the Past Decade

Table 8 below shows lift ticket sales at the ski areas and visitor spending at and away from the ski areas in New Hampshire during the past decade. The New Hampshire ski areas reported the data on lift ticket sales and visitor days, while the author estimated visitor spending using all available information.

On a per-person per-day basis, lift ticket sales (any ticket sales for summer activities) are smaller in summer than in winter while overall visitor spending is estimated to be larger in summer than in winter. It may suggest that visitors to the state's ski areas stay longer and engage in more activities during the non-skiing summer and fall season than during the skiing winter season.

A range of 1.7 and 2.4 million people visited the New Hampshire ski areas in the skiing winter season, while a range of 0.4 and 0.7 million people visited in the non-skiing summer and fall season. On a per-person per-day basis, a skier spent in a range of $109 and $132 per day in the State at and away from the ski areas in the skiing winter season, while a visitor spent in a range of $133 and $151 per day in the non-skiing summer and fall season.

Table 8. Visitor Spending per Person per Day, 2009/10-2017/18

Season	Lift Ticket Sales (thousands of dollars)	Visitor Spending (thousands of dollars)	Visitor Days	Lift Ticket Sales per Person per Day	Visitor Spending per Person per Day
Winter					
2009/10	$59,073	$263,028	2,417,095	$24.4	$109
2010/11	$57,439	$254,879	2,249,075	$25.5	$113
2011/12	$53,244	$234,839	2,090,065	$25.5	$112
2012/13	$61,650	$272,638	2,345,521	$26.3	$116
2013/14	$65,211	$288,947	2,290,878	$28.5	$126
2014/15	$69,910	$284,392	2,387,019	$29.3	$119
2015/16	$50,265	$204,082	1,732,127	$29.0	$118
2016/17	$70,256	$286,358	2,259,499	$31.1	$127
2017/18	$68,504	$278,830	2,105,331	$32.5	$132
Summer					
2009/10	$5,255	$54,426	408,469	$12.9	$133
2010/11	$8,000	$82,850	549,163	$14.6	$151
2011/12	$7,939	$82,222	544,958	$14.6	$151
2012/13	$8,666	$89,749	598,330	$14.5	$150
2013/14	$7,087	$73,392	485,881	$14.6	$151
2014/15	$9,764	$93,528	671,383	$14.5	$139
2015/16	$9,980	$95,597	686,348	$14.5	$139
2016/17	$10,510	$100,673	723,066	$14.5	$139
2017/18	$10,950	$104,891	701,083	$15.6	$150

XII. Total Effect of Visitor Spending, 2014/15 – 2017/18

The estimates of all four years were calculated using the latest IMPLAN 2016 data. The underlying assumption is that the structure of the economy does not change significantly over a short span of four years.

Table 9. Ski Travel Party Spending, 2014/15 – 2017/18

	2014/15	2015/16	2016/17	2017/18
Tickets/admissions	$118,339	$88,304	$120,139	$117,114
Restaurants	$77,985	$61,630	$80,515	$78,431
Travel costs	$65,883	$55,909	$69,490	$67,645
Lodging	$57,122	$46,083	$59,402	$57,815
Grocery stores	$39,066	$34,171	$41,576	$40,471
Retail	$22,333	$18,340	$23,342	$22,719
Total	$380,728	$304,437	$394,464	$384,195

The dollar amounts are shown in thousands of current dollars (i.e., the dollar amounts of the 2014/15 season are shown in 2014/15 dollars; dollar amounts of the 2015/16 season in 2015/16 dollars; and so on).

Table 10. State and Local Government Tax and Fee Receipts, 2014/15 – 2017/18

Source, in thousands	2014/15	2015/16	2016/17	2017/18
Rooms and Meals Tax	$14,022	$11,284	$14,598	$14,469
Business Tax	$2,512	$2,362	$2,996	$3,289
State Liquor Store Sales	$2,356	$2,011	$2,551	$2,800
Tolls and Gas Tax	$1,145	$888	$1,127	$1,237
Tobacco and Beer Tax	$929	$717	$910	$999
Parks and Recreation	$78	$64	$82	$90
Other State Taxes and Fees	$12,497	$9,478	$12,022	$13,198
Total State Government	$33,540	$26,805	$34,285	$36,080
Local Government Taxes and Fees	$26,579	$25,375	$28,100	$28,095
Total State and Local Government	$60,119	$52,181	$62,385	$64,176

The dollar amounts are shown in thousands of current dollars (i.e., the dollar amounts of the 2014/15 season are shown in 2014/15 dollars; dollar amounts of the 2015/16 season in 2015/16 dollars; and so on). Other State Taxes and Fees include telecommunications, banking, insurance, utility consumption tax, utility property tax, state property tax, and real estate transaction taxes and fees.

Table 11. Summary of Economic Contribution, 2014/15 – 2017/18

Impact Type	Employment	Labor Income	Value Added	Output
2017/18, in millions of 2018 $				
Direct Effect	5,997	$124	$175	$285
Indirect Effect	566	$31	$57	$95
Induced Effect	923	$45	$78	$128
Total Effect	7,485	$200	$311	$508
2016/17, in millions of 2017 $				
Direct Effect	5,053	$117	$169	$293
Indirect Effect	585	$32	$59	$97
Induced Effect	889	$43	$75	$123

Total Effect	6,527	$192	$303	$512
2015/16, in millions of 2016 $				
Direct Effect	3,994	$94	$133	$222
Indirect Effect	448	$24	$45	$74
Induced Effect	710	$34	$59	$97
Total Effect	5,152	$152	$237	$393
2014/15, in millions of 2015 $				
Direct Effect	5,080	$115	$166	$284
Indirect Effect	576	$30	$57	$94
Induced Effect	887	$42	$73	$121
Total Effect	6,543	$188	$296	$500

Value added is defined as labor income, other types of property income (such as dividends, interest income, rent income, and profits), taxes on production and imports. Output is the sum of value added and the cost of all the inter-industry purchases required for production.

XIII. Changes in Methodology

This study is not directly comparable to the past studies authored by the Institute for New Hampshire Studies (INHS) on the economic contribution of the ski industry in New Hampshire due to changes in the methodology and data.

Table 12. Comparing the 2012/13 and 2017/18 Study

	2012/13	2017/18
Visitor Days	3,262,652	2,806,414
Direct Spending	$359	$384
Direct Employment	7,835	5,997
Total Employment	11,067	7,485
State Gov. Receipts	$32	$36
Local Gov. Receipts	$29	$28

The dollar amounts are shown in millions of current dollars

Visitor counts and spending were estimated differently in the 2017/18 study.

One of the key pieces of information used to estimate the total visitor spending at and away from the ski areas is skier spending by category. The National Ski Areas Association (NSAA) used to collect this information but not anymore. Thus, the 2017/18 study used the U.S. National Forest's National Visitor Use Monitoring (NVUM) program as an alternative. The NVUM program reports how much visitors to the National Forests spend by category and activity type (i.e., alpine skiing). Secondly, visitor counts in the 2017/18 study did not include one type of winter visitors to the ski areas. The past studies counted visitors who didn't ski but engaged in the other winter recreational activities such as ziplining, indoor wall climbing, and tubing. However, the author decided not to include this type of winter visitors due to the questionable quality of survey reports for such visitors. In this sense, the 2017/18 estimates may be more conservative.

Why are indirect and induced effects in the 2017/18 smaller?

The multiplier (indirect and induced) effect estimates seem smaller in the 2017/18 study than in the past studies. For example, total employment directly and indirectly supported by visitor spending was 11,067 in the 2012/13 study, while it was only 7,485 in the 2017/18 study. See Table 12. It is important to note that this change doesn't mean the contribution of the ski industry declined between the two periods. Instead, it is largely because of differences in the input/output models used to estimate the multiplier effects. The 2017/18 study employed IMPLAN, while the past studies used the INHS in-house model. IMPLAN has become a standard model in economic impact studies in recent years. The models are different in many ways. Not only are they different in the level of sophistication of the model, but also by varying definitions of variables, sources of data, and industry classification. The following is the list of major differences between the two models, which led to the differences in the economic impact estimates.

1. **The primary variable**: The INHS model uses sales as the primary variable, while IMPLAN uses output. In services-providing industries such as the hospitality industry, sales and output should be the same, all else being equal. However, sales may not equal output in other industries. For example, in wholesale and retail trade, output is gross margin, which is sales minus producers' prices; in manufacturing, output is sales minus inventories.
2. **The source of primary data**: The source of data adds another layer to the difference in the primary variable. The INHS's sales data come from the U.S. Economic Census, while IMPLAN's output is obtained from the U.S. Bureau of Economic Analysis (BEA). The way in which the two agencies collect the data may not be identical for the following reasons. First, while BEA output is reported at the corporate level, the Economic Census is at the establishment level. Secondly, the two U.S. agencies may not define each industry in the same manner. Thirdly, sales reported in the Economic Census exclude the production of foreign subsidiaries, while the BEA's output doesn't. This last point is a cause for a large discrepancy in some industries like manufacturing which has a large foreign manufacturer such as BAE systems.
3. **The definition of income**: Income refers to personal income in the INHS model, while it means labor income in IMPLAN. Both income measures come from BEA. Personal income is a broader income category than labor income; personal income represents labor income plus other sources of income, including rental income, interest income, and dividend income.
4. **The base year of the data**: The IMPLAN model is based on calendar year 2016, while the INHS model is based on fiscal year 2012. Fiscal year 2012 is July 2011 through June 2012.
5. **The level of industry aggregation**: The IMPLAN model groups industries based on the level of similarity in the production function; thus, impacts are estimated at finer levels of industries than the INHS model which groups industries at the 2-digit level of the North American Industry Classification System. IMPLAN includes more than 400 industries, compared to INHS' 11 industries.
6. **The governments as industries**: This is related to Point 5 above. In IMPLAN, the activity of the governments is divided into multiple categories, including the following three: 1) government enterprises (such as electric utilities and local transit); 2) indirect business taxes (such as rooms and meals tax); and 3) the governments as the providers of public services (such as police, fire fighters, and road maintenance). Only the first category of government enterprises is included in the processing sector and used to measure indirect/induced impacts. In the INHS model, on the other hand, all government-related activities are included in the processing sector as one government sector, and used to measure indirect/induced impacts. This is largely responsible for larger indirect impacts estimated by the INHS model. The greater portion of inputs (from governments in this case) that is purchased locally, the larger the indirect impacts are.
7. **The share of household consumption purchased locally**: The INHS model assumes 49 percent of the state's household consumption during 2012 was purchased locally, while IMPLAN assumes only 25 percent was supplied locally. This is a major cause for discrepancies in induced impacts. The more earnings spent locally, the larger induced impacts are.

XIV. References

The Ski New Hampshire and Plymouth State University. (2018). *Detailed Business Information of the New Hampshire Ski Areas*.

The National Ski Areas Association Survey. (2017/18). *Demographic Skier/Snowboarder Research*.

The United States Department of Agriculture: Forest Service. (2017). *Spending Patterns of Outdoor Recreation Visitors to National Forests*. <https://www.fs.fed.us/pnw/pubs/pnw_gtr961.pdf >

The National Oceanic and Atmospheric Administration. *The number of days > trace of snow and the number of days > trace of rain.* Retrieved from <https://www.ncdc.noaa.gov/cdo-web/datasets/GSOM/stations/GHCND:USW00014745/detail>

Economic Impact Analysis for Planning. (2016).