



## The Economic Contributions of Northern Arizona University to the State of Arizona in 2014

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**Executive Summary**

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Fiscal Year 2014 marked the 115<sup>th</sup> anniversary of Northern Arizona University. In the years since 1899, NAU has grown from a teacher's college with 23 enrolled students to an educational and economic anchor for Northern Arizona, offering more than 80 undergraduate and 50 graduate degrees, and serving a statewide body of over 27,000 students. In addition to the Flagstaff Mountain Campus, nearly 3,000 students earned NAU credit at 35 community campuses across the state, and the university's leading online learning program enrolled over 3,800 students.

This economic contribution study quantifies the annual spending that occurs within Arizona and is attributable to the operations of NAU. These include statewide budget expenditures; student and visitor spending in Flagstaff; and statewide alumni and retiree spending. The spending patterns of these five categories have been analyzed using IMPLAN, the foremost nationally-recognized input-output modeling system which uses county-level data to develop accurate and timely projections of how changes in demand affect all sectors of the economy.

The major findings of this study are:

- NAU contributes approximately \$1.845 billion in economic activity annually to the Arizona Economy;
- NAU activities support 20,344 jobs in Arizona;
- Every year NAU's 88,676 Arizona-resident alumni pay over \$68 million in incremental state income taxes due to their educational attainment.

**Annual Short-term State Impact:**

- a. For every \$1.00 appropriated by the state \$16.72 in economic impact is produced
- b. For every \$1.00 in state appropriations to NAU, \$0.83 in estimated state and local taxes is collected annually.

**Long-term State Impact:**

- c. NAU contributes approximately \$2.7 billion in increased expected work life earnings for its graduates each year. Sixty-one percent of living NAU graduates reside in Arizona, and thus \$1.65 billion gets circulated in the Arizona economy each year by alumni.
- d. Each year's graduating class creates an estimated \$3.59 billion in incremental economic activity (2014 dollars) during their estimated working life due to academic attainment at NAU.

- e. Each \$1.00 in state appropriations to NAU generates \$32.54 in long run economic activity in Arizona.
- f. Fiscal Year 2014 graduates alone will pay an estimated \$125 million in state and local taxes (2014 dollars) during their working life.
- g. Each \$1.00 appropriated by the state will generate \$1.13 in state and local taxes in the long-run.

**Overall Impact:**

- h. Ultimately, (both long and short run) each \$1.00 appropriated by the state will return \$1.96 to the state in the form of state and local taxes, and \$49.26 in economic activity.

**Impact on the Coconino County Economy:**

- a. NAU activities contributed \$1.158 billion and 13,583 jobs to the Coconino County Economy.
- b. This represents one in five jobs within the county (total: 67,400).
- c. Every \$1.00 in state appropriations to NAU generates \$10.49 in economic activity within Coconino County.
- d. Annually around \$57.6 million in state and local taxes are collected in Coconino County due to NAU's activities. For every \$1.00 appropriated by the state, \$0.52 in state and local taxes is generated in the county.

In addition to monetary contributions, NAU is essential to the economic development that takes place in Northern Arizona and may other areas of the state. Among the channels through which NAU achieves this are the Phoenix Biomedical Campus, The Economic Collaborative of Northern Arizona, and the Northern Arizona Center for Entrepreneurship and Technology.

The Phoenix Biomedical Campus, a partnership with the University of Arizona and others, is addressing a pending shortage in Arizona's healthcare work force. Through NAU, students are studying to earn doctorates in physical therapy and occupational therapy. Students also train to be physicians assistants. These programs are developed in direct response to projected increases in demand within the fields.

The university is a primary supporter of the Economic Collaborative of Northern Arizona (ECoNA). In 2014 ECoNA participated in attracting 700 new high-quality jobs which impacted the local economy by over \$40 million. It also helped existing firms to expand by 375 new jobs.

The Northern Arizona Center for Entrepreneurship and Technology (NACET) provides an incubator facility for startup businesses focusing on technological advancement. In 2014 NACET had an estimated economic impact of \$43 million and 250 new jobs. Its clients drew in a total of \$70 million in outside venture capital.

Although significant, the economic benefits calculated in this study should be considered conservative. They omit many value enhancing intangibles. Among these are the many businesses attracted to the region by the intellectual, social, and scientific atmosphere fostered by a major university. Also, the societal benefits of an educated population are well documented, and include reduced use of social services, reduced incarceration rates, and greater community involvement.

## Introduction

This analysis is the latest in a series of reports that have measured the economic contributions of Northern Arizona University (NAU) to the State of Arizona. It also isolates the contributions of NAU within Coconino, Maricopa, and Yuma Counties, and the Balance of State (12 counties). All contribution estimates are specific to the Fiscal Year beginning July 1, 2013, and ending June 30, 2014 (FY14). Universities such as Northern Arizona University serve as centers for learning and research; however, they also act as major contributors to the economic development of the regions where they exist.

The economic well-being of the residents of Flagstaff and other communities throughout Arizona is enhanced by the purchases of goods and services and the jobs created as a result of the daily activities on NAU's campuses. The influx of outside monies and the ongoing research and development activities also contribute to an enhanced quality of life for Arizona citizens. Thus it is important from time to time for the university to quantify its impacts in order to provide a measure of the return on the investment of public funds spent in support of higher education.

At present, nearly 85 percent of NAU students are enrolled at the Flagstaff campus; however, given NAU's role as a significant provider of education throughout Arizona, the impact of the university is not confined to Coconino County. This study, therefore, is designed to measure these contributions on a statewide level. Separate models were produced to demonstrate the impacts occurring on several distinct regions within Arizona as well as on the overall state.

Contributions are linked specifically to the university's expenditures, as well as spending by employees, students, campus visitors, retirees, and a hypothetical one-year graduating class.

The overall impact greatly exceeds the initial impact created these expenditures. As these dollars are spent and re-spent within each county, a multiplier effect is created which generates additional dollars in the local economies. Therefore, two sets of impacts are provided – the direct or initial impacts, and the multiplier impacts, which result from dollars being re-spent in the economy. The total contributions to the economy are estimated when the direct and multiplier impacts are combined. The number of jobs created in each location as well as the amount of wages, salaries and personal income generated as a result of these activities in FY14 are also estimated.

Although studies of this type focus on the monetary effects of these expenditures, the full impact of NAU extends far beyond the dollars and cents associated with daily spending activities. The additional effects are called non-monetary impacts; however these typically are not included in economic impact studies because their impacts are difficult to measure. For example, the dollar impact associated with increased levels of cultural and sports activities occurring in Flagstaff due to NAU's presence in the community are not quantified. Furthermore, the population of Coconino County is clearly influenced by the presence of Northern Arizona University in the area. Migration of residents and businesses into the region is due, in part, to the existence of NAU and the job and research opportunities associated with such a large employer.

## History of Northern Arizona University

The origins of NAU are traced to September, 1899, when the Arizona Territorial Legislature established the forerunner Northern Arizona Normal School. Twenty three students were enrolled in the first class. Growth of the Normal School, both in enrollment and in its importance to the State, eventually led to changes in the institution's status and name. In 1925, the state legislature changed the school's status to that of a four-year degree-conferring college and authorized the initial Bachelor of Education degree program. In the same year, the name of the school was changed to Northern Arizona State Teachers College, and in 1929, the name was changed once again to Arizona State Teachers College at Flagstaff.

In 1937, the legislature authorized the first Master of Arts in Education program. In 1945 the school's name was changed to Arizona State College at Flagstaff. The Bachelor of Science in Forestry was authorized in 1958.

Arizona State College became Northern Arizona University on May 1, 1966. Two years later, the Arizona Board of Regents approved the authorization of the first doctoral programs at NAU in the areas of Biological Science and in Education.

Northern Arizona University's role in higher education in Arizona has expanded in numerous ways since 1966 – the year it became a university. By FY14, across all of NAU's campuses and online, the FY14 student headcount was 26,606, with 19,320 enrolled at the Flagstaff Campus<sup>1</sup>. Current enrollment exceeds 27,000.

NAU and staff make significant contributions to community and public service across the state. Numerous curricular changes have been implemented that focus on the global society emphasizing the international, sustainable and diverse environments that our students encounter in the 21<sup>st</sup> century. The citizens of Arizona also benefit from ongoing initiatives in education, environmental and ecological research, business, nursing and hotel/restaurant management as well as from outreach activity undertaken by university centers and institutes. The impacts include a growing and significant amount of externally funded research conducted by university faculty.

The NAU main campus (The Mountain Campus) is located on approximately 740 acres of land in Flagstaff. The university also operates the Phoenix Biomedical Campus, and the Yuma campus at Arizona Western College. Students also can enroll at over thirty NAU Statewide campuses as part of NAU Extended Learning programs, while others earn their degrees online.

## The Role of Universities in Economic Development

Faculty members at universities are responsible for generating significant numbers of ideas that have been used by economic developers across the nation. Business incubators such as the Northern Arizona Center for Emerging Technologies (NACET) exist in locations where universities increasingly assume a leadership role in providing technical assistance to businesses as well as instituting applied research and facilitating technology transfer to enhance economic development in local communities.

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<sup>1</sup> Student counts are reported in the *Northern Arizona University Fact Book 2013-14*, published by the Office of Planning and Institutional Research. The numbers used in this study are from the Fall, 2013 student headcount.

Over time, the missions of universities have evolved to include activities that promote economic growth within the state. NAU is an active participant in the promotion of economic development across Arizona. Faculty members working at NAU provide leadership at both national and state levels in fields as diverse as biological research, natural resource and conservation efforts, tourism research and Native American and rural policy programs and initiatives.

### **Measuring the Economic Impacts of a University**

The traditional approach used to estimate the economic impact of a university is to measure the dollar impact of the additional economic activities which accrue to a region but which would disappear if the university were to close down or were not located in that area. Economic impacts occur whenever the university spends dollars for capital and operations items. In addition, spending by university employees and students, as well as by visitors to the campus, contributes to the impact. This study also includes spending by NAU retirees and one year's graduating class.

Local economies across Arizona would be influenced if these expenditures were to end. For example, receipts at local hotels and other lodging facilities would decline with the reduction of out-of-town visitors to the campus and to its students. Local restaurant and entertainment enterprises also would feel the negative impacts. Banking, insurance and other business and personal services firms would experience a reduction in their sales and service activities.

The closure of a university also impacts the region's supply of available labor. Many businesses depend on university students and employees as primary sources of labor and technical expertise. The decreased availability of student workers and interns would increase operating costs for local firms when they were compelled to increase wages to replace relatively inexpensive laborers with more expensive workers.

A host of quality-of-life activities also are associated with a university, and these would be negatively impacted if the university was not present in the region. Most obvious, perhaps, are the athletic and cultural events held at university locations. Local public radio programming would disappear, numerous seminars and workshops conducted by university personnel would decline, and the overall physical and cultural infrastructure of the region typically shrinks in a smaller environment.

### **The Multiplier Effect**

When the level of direct expenditures increases in a region, these dollars are spent and re-spent in the local economy, creating additional incomes and jobs. This generates a magnified impact on the region called the "multiplier." The process also works in reverse when the level of expenditure in an area declines in which case the reduced levels of spending generate additional cutbacks in the region and reduce employment. This begins a negative chain of events that result in local economic decline.

The value of multipliers varies based upon the type and amount of spending and re-spending that occur within a community. Therefore, every location has its own multiplier. For example a multiplier of 2.00 means that \$1 million of direct spending generates an additional \$1 million in spending, and the total contribution in the area will be \$2 million. Similarly, a decline in spending by \$1 million dollars would cause a \$2 million drop in overall spending in that area.



## Non-Quantifiable Costs and Benefits

This approach to measuring economic impact focuses only on the spending attributed to the presence of the university and as such, the true impact of the university on the local economy is underestimated. As an example, the existence of a university may increase home values in an area. Rental costs for local houses and apartments may rise due to the higher demand resulting from the presence of thousands of students and faculty who live in the area because of the university. Although the impacts of higher housing costs are not measured by the model, the demand for housing exhibited by these residents, particularly in the areas adjacent to the university, is responsible for the elevated cost of housing in many university towns.

The typical economic impact model also ignores the impacts on state and local areas associated with the benefits arising from the discovery and application of significant scientific and technological research outcomes stemming from faculty and student activities. These outcomes can greatly influence the quality of life and well-being of millions of citizens, yet the direct tie-in to the university is often too nebulous to permit an analysis that measures the cause and effect of these activities. Furthermore, this study does not consider enhancements and improvements in the local community resulting from the increase in worker productivity associated with completing a college degree, nor the general attractiveness of a region as a desirable place to work and live due to the presence of the university in the area. While these factors impact local living conditions, their measurement is extremely difficult and their impacts are not incorporated into this study.

College graduates also tend to consume fewer social services. Areas with a more educated population tend to have lower incarceration rates and require less assistance from the government. Unemployment rates provide an example of this. Table 1 shows 2013 estimates from the Census Bureau comparing unemployment rates by degree attainment.

Table 1: Unemployment rates by degree attainment, Arizona and nation

Education	United States	Arizona
High School Graduate	9.0%	9.5%
Some College/ Associate's	7.1%	7.1%
Bachelor's or Higher	3.8%	3.6%

2013 American Community Survey, 1-year Estimate

In Arizona, the unemployment rate for high school graduates was 9.5%. For college graduates, that rate was only 3.6%. The trend holds for the national unemployment picture, too. In Arizona, non-degree holders face higher unemployment than nationally, and degree holders face lower unemployment than nationally.

## Costs vs. Benefits of a University

Although a university brings numerous and significant benefits to a local area that region also incurs increased costs due to the university's presence in the region. One example of these costs is the revenue foregone from tax-exempt property owned by the university. Since the land and infrastructure occupied by most state universities is removed from the local tax rolls, the assessment on remaining property in the region is likely to be higher to make up for lost revenues. A lack of adequate levels of parking and increased congestion in and around the university often occurs. Additional costs are imposed on the city

water and sewer infrastructure as well as increased costs of enhanced police and fire protection. The increased rental costs in the region were already mentioned above. Finally, the demands on local school systems are often impacted due to the existence and enrollment of increased numbers of school-age children of the university employees and students. However, any large-scale level of economic activity will impose similar costs on a community, and these items must be considered as part of the overall cost-benefit picture that emerges in a growing community.

The following section describes the methodology employed to estimate the economic impact of Northern Arizona University on the State of Arizona and the local communities where NAU provides educational opportunities.

### **Methodology**

As mentioned above, the period of analysis for this study is FY14, which began July 1, 2013 and ended on June 30, 2014. The economic contributions resulting from NAU activities are presented for the entire state, Coconino County, Maricopa County, Yuma County, and for the remaining 12 counties, referred to as Balance of State (or BOS).

IMPLAN (Impact Analysis for PLANing) is the computer model used for this study. Developed at the University of Minnesota in 1988, IMPLAN is an input-output model that uses federal statistics at the federal, state, congressional district, county, or zip code level to provide regionally-specific estimates of effects stimulated by changes in economic demand. IMPLAN is a widely-accepted model, the industry standard for economists and government analysts. The version used in this study leverages federal data from 2012 (the most recent available) to estimate effects on specific state and county regions.

On a basic level, IMPLAN analysis explains how a demand change in a given industry affects demand in the rest of the economy. If demand for a product increases, producers must make purchases in order to meet the demand. Each purchase generates demand in more industries. Thus, an initial change in demand causes an increase in economic activity and employment.

Modeling something like university spending in the economy indicates how that budget ripples through the economy in terms of economic activity and jobs supported. Since the effects of economic activity traced to the university in 2014 have already occurred, they are considered “contributions.” Identifying economic contributions shows just how spending fits into the overall economy, essentially quantifying spending and job creation/support attributable to the university.

IMPLAN identifies three distinct effects on a region – direct, indirect, and induced. For simplicity of interpretation, the main body of this report will aggregate indirect and induced effects under the term “multiplier effects.”

This report lists those effects in terms of jobs (both full- and part-time), labor income (including employee wages and benefits and proprietor income), and economic activity (referred to in IMPLAN as output, indicating dollars spent).

### **Contribution Categories**

The contributions of NAU were analyzed by into five distinct components.

1. The most significant of these is the university budget, including both the operations and capital budget. This includes direct spending by the university and the ripple effects of that spending, which include employee spending and purchases of the goods and services required for the school to operate and grow. The numbers used in this study were obtained from appropriate NAU departments and offices throughout the campus network.
2. The second largest source of economic contribution is spending by students attending the Mountain Campus in Flagstaff. Correcting for expenditures made to NAU, which are ultimately part of the university budget, student spending represents an enormous source of economic activity in the region. The data used to develop this estimate was obtained by a survey distributed by the Arizona Hospitality Research and Resource Center.
3. Additional contributions are attributed to the spending by visitors to the Mountain Campus. This accounts for dollars spent at athletic, music, cultural and other events occurring on the campuses as well as by friends and family who visit or conduct business at the university. Some stay overnight, others do not; still others spend several days on campus for retreats, camps, Road Scholar events and other activities that span several days.
4. Spending by NAU retirees also was considered. Expenditures by retirees are considered since their presence in the state can be partly attributed to their prior employment at the university. In line with the methodology presented earlier, these individuals may not have a reason to reside in Arizona if NAU had not been here to provide them employment. Their continued residence in Arizona in their post-employment years can, therefore, be counted as part of NAU's contribution to the state and county-level impacts.
5. Finally, in FY14, NAU conferred over 7,000 degrees and certificates to its students. These graduates will earn greater salaries over the course of their working lives compared to what they would earn without their degrees. Therefore, the incremental spending that results from the higher incomes earned by NAU alumni also contributes to the NAU impact on the state economy. Since this study is designed to measure annual contributions, only one year of alumni spending is included in the total.

The economic activity supported by each of these activities are discussed and presented in the following sections of this report. The overall contributions in each region was compiled by summing the impacts generated by each of the five spending groups. Comparable analyses are presented here for the State of Arizona as well as for the four separate regional models (Coconino, Maricopa, Yuma, Balance of State).

The totals reported of the four regional models will not equal the Arizona overall numbers. This is because regional impacts ignore spending that occurs out of that region.

Information is presented and analyzed at the statewide level and for each of the county areas listed above for the following variables:

- Total expenditure or economic activity in dollars
- Employment in number of jobs, both full-and part time
- Labor income, in dollars

## Overall Contributions

Following are the results of the contributions analysis. In cases where multiple geographies are covered, the typical order is – State of Arizona, Coconino County, Maricopa County, Yuma County, Balance of State. Initially the aggregate total estimated impacts of each source is listed by geography. Later, the economic activity of each source will be discussed in greater detail, separating direct and multiplier effects.

### Overall Contributions in the State of Arizona

Total contributions to the Arizona economy by source in FY14 was:

<b>University Expenditures</b>	<b>\$891 million and 11,439 jobs</b>
Students	\$503 million and 4,594 jobs
Visitors	\$142 million and 1,372 jobs
Retirees	\$60 million and 568 jobs
Alumni	\$250 million and 2,371 jobs
<b>Total Statewide Contributions:</b>	<b>\$1,845 million and 20,344 jobs</b>

### Overall Contributions in Coconino County

Total contributions to the Coconino County economy by source in FY14 was:

<b>University Expenditures</b>	<b>\$618 million and 7,851 jobs</b>
Students	\$400 million and 4,160 jobs
Visitors	\$105 million and 1,193 jobs
Retirees	\$7 million and 92 jobs
Alumni	\$22 million and 287 jobs
<b>Total Contributions to Coconino County:</b>	<b>\$1,152 million and 13,583 jobs</b>

### Overall Contributions in Maricopa County

Total contributions to the Maricopa County economy by source in FY14 was:

<b>University Expenditures</b>	<b>\$7 million and 54 jobs</b>
Retirees	\$30 million and 277 jobs
Alumni	\$124 million and 1,137 jobs
<b>Total Contributions to Maricopa County:</b>	<b>\$161 million and 1,468 jobs</b>

### Overall Contributions in Yuma County

Total contributions to the Yuma County economy by source in FY14 was:

<b>University Expenditures</b>	<b>\$6 million and 296 jobs</b>
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Retirees	\$1.8 million and 21 jobs
Alumni	\$8.6 million and 104 jobs
<b>Total Contributions to Yuma County:</b>	<b>\$16 million and 421 jobs</b>

## Overall Contributions in the Balance of the State

Total contributions to the Balance of State economy by source in FY14 was:

University Expenditures	<b>\$30 million and 1,243 jobs</b>
Retirees	\$18 million and 172 jobs
Alumni	\$85 million and 806 jobs
<b>Total Contributions to Balance of State:</b>	<b>\$133 million and 2,221 jobs</b>

## Calculation of Impacts

Tables 2 and 3 list the total impacts by source and geographical area. Table 2 lists economic activity, which is a measure of total spending in 2014 dollars. Table 3 lists total estimated jobs supported, which can be either full or part-time.

Table 2: Estimated total contributions, economic activity

Total Estimated Contributions (in \$1,000)							
Total Economic activity	Operations	Capital	Students	Alumni	Visitors	Retirees	Total
Arizona	\$775,500	\$115,400	\$502,500	\$250,300	\$141,600	\$60,000	\$1,845,300
Coconino County	\$538,300	\$80,000	\$400,400	\$21,900	\$105,000	\$7,000	\$1,152,700
Maricopa County	\$1,400	\$5,800	NA	\$124,200	NA	\$30,200	\$170,000
Yuma County	\$6,000	\$42	NA	\$8,600	NA	\$1,800	\$18,300
<b>Balance of State</b>	<b>\$29,800</b>	<b>NA</b>	<b>NA</b>	<b>\$85,200</b>	<b>NA</b>	<b>\$18,200</b>	<b>\$143,000</b>

Table 3: Estimated total contributions, jobs

Total Estimated Job Contributions							
Total Jobs	Operations	Capital	Students	Alumni	Visitors	Retirees	Total
Arizona	10,491	948	4,594	2,371	1,372	568	20,344
Coconino County	6,974	877	4,160	287	1,193	92	13,583
Maricopa County	10	44	NA	1,137	NA	277	1,468
Yuma County	295	1	NA	104	NA	21	421
<b>Balance of State</b>	<b>1,243</b>	<b>NA</b>	<b>NA</b>	<b>806</b>	<b>NA</b>	<b>172</b>	<b>2,221</b>

## Operations Budget

Operational spending data was provided by the University Budget Office. Total FY14 expenditures of approximately \$403 million were analyzed using IMPLAN. The total estimated economic contribution of this level of university expenditure is approximately \$775 million across the state. This level of activity supports an estimated 10,491 jobs providing \$420 million in labor income. Table 4 shows these contribution estimates.

Table 4: Estimated Contributions of Operations Budget, Statewide

Statewide	Employment	Labor Income	Economic activity
Direct Effect	7,733	\$292,700,000	\$402,900,000
Multiplier Effects	2,758	\$127,400,000	\$372,600,000
<b>Total Effect</b>	<b>10,491</b>	<b>\$420,100,000</b>	<b>\$775,500,000</b>

Tables 5-8 show the contribution estimates of the operations budgets as they apply to more specified areas of the state. Budget expenditures were allocated by geographic area by using ratios taken from allocations of state and local funding.

Table 5: Estimated Contributions of Operations Budget, Coconino County

Coconino County	Employment	Labor Income	Economic activity
Direct Effect	5,451	\$275,300,000	\$381,600,000
Multiplier Effects	1,522	\$53,300,000	\$156,700,000
<b>Total Effect</b>	<b>6,974</b>	<b>\$328,600,000</b>	<b>\$538,300,000</b>

In Coconino County operations expenditures contribute an estimated \$538 million and 6,974 jobs to the local economy.

Table 6: Estimated Contributions of Operations Budget, Maricopa County

Maricopa County	Employment	Labor Income	Economic activity
Direct Effect	6	\$400,000	\$800,000
Multiplier Effects	5	\$200,000	\$600,000
<b>Total Effect</b>	<b>10</b>	<b>\$600,000</b>	<b>\$1,400,000</b>

In Maricopa County, operations expenditures contribute an estimated \$1.4 million and 10 jobs to the local economy.

Table 7: Estimated Contributions of Operations Budget, Yuma County

Yuma County	Employment	Labor Income	Economic activity
Direct Effect	280	\$3,500,000	\$4,300,000
Multiplier Effects	15	\$600,000	\$1,700,000
<b>Total Effect</b>	<b>295</b>	<b>\$4,000,000</b>	<b>\$6,000,000</b>

In Yuma County, operations expenditures contribute an estimated \$6 million and 295 jobs to the local economy.

Table 8: Estimated Contributions of Operations Budget, Balance of State

Balance of State	Employment	Labor Income	Economic activity
<b>Direct Effect</b>	1,136	\$14,000,000	\$15,800,000
<b>Multiplier Effects</b>	107	\$4,900,000	\$14,000,000
<b>Total Effect</b>	1,243	\$18,800,000	\$29,800,000

In the remaining counties, operations expenditures contribute an estimated \$29.8 million and 1,243 to the economy.

These expenditures were funded by a variety of sources. Among these was a state appropriation of approximately \$110,335,000.

### Capital Budget

Capital expenditures for projects like the new Science and Health building, the San Francisco Street parking garage, and numerous maintenance and repair projects, occurred almost exclusively on the Mountain Campus in FY14. A small number of capital projects were undertaken in Maricopa and Yuma Counties. These impacts were modeled using IMPLAN, for these three counties and for the overall impact on the state. Tables 9 – 12 show the estimated contributions of capital expenditures.

Table 9: Estimated Contributions of Capital Budget, Statwide

Statewide	Employment	Labor Income	Economic activity
<b>Direct Effect</b>	546	\$30,300,000	\$ 61,600,000
<b>Multiplier Effects</b>	403	\$20,100,000	\$53,800,000
<b>Total Effect</b>	948	\$50,400,000	\$115,400,000

Statewide, capital expenditures contributed an estimated \$115 million and 948 jobs to the economy.

Table 10: Estimated Contributions of Capital Budget, Coconino County

Coconino County	Employment	Labor Income	Economic activity
<b>Direct Effect</b>	652	\$19,900,000	\$58,300,000
<b>Multiplier Effects</b>	225	\$7,200,000	\$21,700,000
<b>Total Effect</b>	877	\$27,100,000	\$80,000,000

In Coconino County, capital expenditures contributed an estimated \$80 million and 877 jobs to the economy.

Table 11: Estimated Contributions of Capital Budget, Maricopa County

Maricopa County	Employment	Labor Income	Economic activity
<b>Direct Effect</b>	25	\$1,600,000	\$3,200,000



<b>Multiplier Effects</b>	19	\$1,000,000	\$2,600,000
<b>Total Effect</b>	44	\$2,600,000	\$5,800,000

In Maricopa County, capital expenditures contributed an estimated \$5.8 million and 44 jobs to the economy.

Table 12: Estimated Contributions of Capital Budget, Yuma County

<b>Yuma County</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Economic activity</b>
<b>Direct Effect</b>	0	\$12,907	\$30,595
<b>Multiplier Effects</b>	0	\$4,597	\$11,986
<b>Total Effect</b>	1	\$17,504	\$42,581

Capital expenditures in Yuma County were almost inconsequential, but contributed around \$42,000 and supported a portion of a job.

Construction budgets can change drastically from year to year. While these estimates use actual spending from FY14, they are not necessarily representative of what happens every year. For example, in FY2013, an intense concentration of construction and maintenance projects required expenditures of over \$300 million.

In the near future, construction projects on the Mountain Campus are expected to continue. From FY2015 through FY2019 an average of \$58 million in construction spending per year is planned.

## Students

The contributions made by student spending are based on students attending the Flagstaff Mountain Campus. These estimates use the Fall Semester, 2013, headcount from the 2014 PAIR Report Factbook.

Student expenditures were estimated using a survey distributed and analyzed by the Arizona Hospitality Research and Resource Center (AHRRC) specifically for the purposes of this study. The AHRRC distributed surveys through email to students attending the Flagstaff Mountain Campus (19,320 students). The survey asked a series of questions, mainly related to personal expenditures in the region. A total of 2,605 students from the Mountain Campus responded to the survey for a response rate of 13.5 percent.

The results indicated that the average student living in Flagstaff spends an estimated \$19,830 in the county, excluding direct payments to the university.

Tables 13 shows the estimated economic contributions on the state linked to Flagstaff student spending.

Table 13: Mountain Campus Student Spending Contributions, Statwide

<b>Statewide</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Economic Activity</b>
<b>Direct Effect</b>	3,131	\$93,800,000	\$310,700,000
<b>Multiplier Effects</b>	1,463	\$68,700,000	\$191,800,000
<b>Total Effect</b>	4,594	\$162,500,000	\$502,500,000

Statewide, students spent enough money to support 4,966 jobs and stimulate \$541 million in economic activity.

Table 14 lists the contributions to Coconino County’s economy only.

Table 14: Mountain Campus Student Spending Contributions, Coconino County

Coconino County	Employment	Labor Income	Economic activity
<b>Direct Effect</b>	3,256	\$93,500,000	\$310,700,000
<b>Multiplier Effects</b>	904	\$29,000,000	\$89,700,000
<b>Total Effect</b>	4,160	\$122,500,000	\$400,400,000

Students on the Flagstaff campus spent enough money to support an estimated 4,160 jobs and \$400 million in economic activity.

Note that direct economic activity in Tables 13 and 14 is less than the total number of students multiplied by the average per-student expenditure (19,320 students X \$19,830 = \$383 million). This is because IMPLAN considers direct effects associated with retail purchases as only the retail sales margin. The difference, approximately \$73 million, is considered immediate leakage, and leaves the county economy before stimulating further spending.

Expected student enrollment growth means that these contributions are sure to grow. The Arizona Board of Regents has set a goal of enrolling 25,000 students on the Flagstaff Mountain Campus by the year 2020. Applying the spending patterns from above to this expected increase of 5,680 students suggests that student spending will increase by that year by \$79 million. According to IMPLAN analysis, the total impact of this spending would be approximately \$101 million (\$2014) and 1,064 jobs supported.

### Earnings differentials

College education is still a significant and quantifiable positive investment. Individuals benefit from the resulting financial, vocational, and intellectual advantages, and society benefits in many ways. The most obvious social benefit of education is economic stimulation stemming from increased earning power, and the resulting tax benefits. As the state of Arizona provides a portion of the funding for state universities, these financial returns are important to note.

The most recent federal data available that relates to earnings by educational attainment come from the U.S. Census Bureau’s 2009-2013 5-Year American Community Survey (ACS). Tables 15 and 16 below use ACS data to estimate earnings expected from degrees granted by NAU. These are identified for the three primary counties and for the entire state.

Table 15: Median Earnings by Educational Attainment by Area

	Arizona	Coconino County	Yuma County	Maricopa County
<b>Total</b>	\$34,083	\$32,274	\$36,769	\$26,139
<b>Less than high school graduate</b>	\$19,110	\$18,549	\$20,244	\$15,263
<b>High school graduate (includes equivalency)</b>	\$26,591	\$26,619	\$27,991	\$22,233
<b>Some college or associate's degree</b>	\$33,740	\$30,371	\$35,935	\$30,958
<b>Bachelor's degree</b>	\$48,461	\$38,371	\$51,454	\$40,604
<b>Graduate or professional degree</b>	\$60,652	\$54,617	\$64,799	\$56,607

Table 16: Value of Degree over Prior Degree by Region

Value*	Arizona	Coconino County	Yuma County	Maricopa County
<b>Some College or Associate's Degree</b>	7,149	3,752	7,944	8,725
<b>Bachelor's Degree</b>	21,870	11,752	23,463	18,371
<b>Graduate or Professional Degree</b>	12,191	16,246	13,345	16,003

\* Value equals the estimated average earnings associated with each level of education above a graduate's most likely previous level of education.

### Increased earnings in 2013, all Alumni Living in Arizona

According to university records, of 144,901 living NAU alumni, 88,676 reside in Arizona. Of these, 44,710 live in Maricopa County, 13,425 live in Coconino County, and 3,632 live in Yuma County. The remaining 26,909 live in one of the other 12 counties.

In the tables below (17-21), earnings differentials are applied to the alumni counts in each of the three counties and the rest of the state.

Table 17 shows that statewide, an estimated \$1.5 billion earned annually by in-state alumni is attributable to education provided by NAU.

Table 17: Estimated Annual Incremental Earnings of Resident Alumni, State of Arizona

	Alumni Count	Average Earnings Differential	Annual Incremental Earnings
<b>Total, Statewide</b>	88,676	\$17,080	\$1,514,597,627

Table 18: Estimated Annual Incremental Earnings of Resident Alumni, Coconino County

Coconino County			
Degree Type	Count	Earnings Differential	Annual Incremental Earnings
Associate's or Some College	45	3,752	\$168,840
Bachelor's	9,530	11,752	\$111,996,560
Graduate	3,850	16,246	\$62,547,100
<b>Total</b>	<b>13,425</b>		<b>\$174,712,500</b>

Table 19: Estimated Annual Incremental Earnings of Resident Alumni, Maricopa County

Maricopa County			
Degree Type	Count	Earnings Differential	Annual Incremental Earnings
Associate's or Some College	91	8,725	\$793,975
Bachelor's	26,429	18,371	\$485,527,159
Graduate	18,190	16,003	\$291,094,570
<b>Total</b>	<b>44,710</b>		<b>\$777,415,704</b>

Table 20: Estimated Annual Incremental Earnings of Resident Alumni, Yuma County

Yuma County			
Degree Type	Count	Earnings Differential	Annual Incremental Earnings
Associate's or Some College	3	7,944	\$23,832
Bachelor's	2,263	23,463	\$53,096,769
Graduate	1366	13,345	\$18,229,270
<b>Total</b>	<b>3,632</b>		<b>\$71,349,871</b>

Table 21: Estimated Annual Incremental Earnings of Resident Alumni, Balance of State

Balance of State			
Degree Type	Count	Earnings Differential	Annual Incremental Earnings
Associate's or Some College	71	7,149	\$507,579
Bachelor's	16,885	21,870	\$369,274,950
Graduate	9,953	12,191	\$121,337,023
<b>Total</b>	<b>26,909</b>		<b>\$491,119,552</b>

## FY14 Graduates Incremental Earnings and Economic Contributions

Applying the same differentials used above to FY14 graduate numbers provides the expected annual earning potential for one years' graduating cohort. Furthermore, these increased earnings have been analyzed using IMPLAN to show how one year of alumni (the university's "output") will contribute to the state economy. This analysis uses the following assumptions:

- Only incremental earnings attributable to the highest degree attained create contributions attributable to NAU;
- Graduates will be distributed geographically according to the current distribution of in-state alumni;
- Incremental earnings are as indicated by the 2009-2013 5-Year American Community Survey;
- Spending is analyzed as a Household Income change using IMPLAN.

Under these assumptions, the expected annual earnings of FY14 graduates by region are show in Tables 22-26. The total estimated impact is expected to be \$118 million.

Table 22: Estimated Earnings Differential, FY14 Alumni, Statewide

Balance of State			
	Count	Average Earnings Differential	Aggregate Earnings Differential
<b>Total, Statewide</b>	7,042	\$ 16,768	\$ 118,082,492

Table 23: Estimated Earnings Differential, FY14 Alumni, Coconino County

Coconino County			
Highest Degree Attained	Count	Earnings Differential by Degree (average)	Aggregate Earnings Differential
Associate's or Some College	128	\$3,752	\$480,792
Bachelor's	862	\$11,752	\$10,129,219
Graduate	169	\$16,246	\$2,737,455
<b>Total</b>	<b>1,159</b>	<b>\$11,521</b>	<b>\$13,347,466</b>

Table 24: Estimated Earnings Differential, FY14 Alumni, Maricopa County

Maricopa County			
Highest Degree Attained	Count	Earnings Differential by Degree (average)	Aggregate Earnings Differential
Associate's or Some College	259	\$8,725	\$2,260,938
Bachelor's	2,390	\$18,371	\$43,912,159
Graduate	796	\$16,003	\$12,740,132
<b>Total</b>	<b>3,446</b>	<b>\$17,098</b>	<b>\$58,913,230</b>

Table 25: Estimated Earnings Differential, FY14 Alumni, Yuma County

Yuma County			
Highest Degree Attained	Count	Earnings Differential by Degree (average)	Aggregate Earnings Differential
Associate's or Some College	9	\$7,944	\$67,864
Bachelor's	205	\$23,463	\$4,802,190
Graduate	60	\$13,345	\$797,828
<b>Total</b>	<b>273</b>	<b>\$20,762</b>	<b>\$5,667,882</b>

Table 26: Estimated Earnings Differential, FY14 Alumni, Balance of State

Balance of State			
Highest Degree Attained	Count	Earnings Differential by Degree (average)	Aggregate Earnings Differential
Associate's or Some College	202	\$ 7,149	\$1,445,392
Bachelor's	1,527	\$21,870	\$33,398,050
Graduate	436	\$12,191	\$5,310,473
<b>Total</b>	<b>2,165</b>	<b>\$18,548</b>	<b>\$40,153,914</b>

The estimated aggregate earnings differentials calculated in Tables 22-26 were analyzed as household income changes using IMPLAN models specific to each geographical region. The results, shown in Table 27, provide an estimate of how the increased earning potential of graduates in each region contributes to the overall economy.

Table 27: Estimated impacts of spending by FY14 Graduates

Geographic Area	Estimated Alumni Count	Estimated Aggregate Income	Jobs Supported	Labor Income Supported	Total Economic activity Stimulated
<b>Statewide</b>	7,042	\$118,100,000	1,024	\$47,100,000	\$132,200,000
<b>Coconino County</b>	1,159	\$13,300,000	85	\$3,000,000	\$8,600,000
<b>Maricopa County</b>	3,446	\$58,900,000	498	\$24,300,000	\$65,300,000
<b>Yuma County</b>	273	\$5,700,000	26	\$1,000,000	\$2,900,000
<b>Balance of State</b>	<b>2,165</b>	<b>\$40,200,000</b>	<b>348</b>	<b>\$16,000,000</b>	<b>\$45,000,000</b>

The sum of county data may vary slightly from statewide data due to rounding

The data in Table 27 represents *induced impacts*. The jobs and economic activity estimates shown there are a result of increased household earnings that result in spending by 2014 alumni. These numbers do not include direct spending by alumni, and the jobs it supports. Tables 28-32 list total contribution estimates by geography, including estimated direct spending and the estimated jobs supported by it.

Table 28: Estimated Economic Contributions of FY14 Alumni Spending, Statewide

Statewide	Jobs	Economic activity
Direct Effect	1,347	\$118,100,000
Multiplier Effects	1,024	\$132,200,000
<b>Total Effect</b>	<b>2,371</b>	<b>\$250,300,000</b>

Statewide, FY14 graduates' spending contributes an estimated \$250 million in economic activity, which supports 2,371 jobs.

Table 29: Estimated Economic Contributions of FY14 Alumni Spending, Coconino County

Coconino County	Jobs	Economic activity
Direct Effect	201	\$13,300,000
Multiplier Effects	85	\$8,600,000
<b>Total Effect</b>	<b>287</b>	<b>\$21,900,000</b>

In Coconino County, 2014 alumni spending contributes an estimated \$21.9 million, supporting 287 jobs.

Table 30: Estimated Economic Contributions of FY14 Alumni Spending, Maricopa County

Maricopa County	Jobs	Economic activity
Direct Effect	639	\$58,900,000
Multiplier Effects	498	\$65,300,000
<b>Total Effect</b>	<b>1,137</b>	<b>\$124,200,000</b>

In Maricopa County, 2014 alumni spending contributes an estimated \$124 million, supporting 1,137 jobs.

Table 31: Estimated Economic Contributions of FY14 Alumni Spending, Yuma County

Yuma County	Jobs	Economic activity
Direct Effect	79	\$5,700,000
Multiplier Effects	26	\$2,900,000
<b>Total Effect</b>	<b>104</b>	<b>\$8,600,000</b>

In Yuma County, 2014 alumni spending contributes an estimated \$8.6 million, supporting 104 jobs.

Table 32: Estimated Economic Contributions of FY14 Alumni Spending, Balance of State

Balance of State	Jobs	Economic activity
Direct Effect	458	\$40,200,000
Multiplier Effects	348	\$45,000,000
<b>Total Effect</b>	<b>806</b>	<b>\$85,200,000</b>

In the remaining counties, alumni spending contributes an estimated \$85 million, supporting 806 jobs.

## Lifetime earnings differentials of 2014 Graduates

The numbers above represent one year's worth of benefits. The advantages of education, however, continue throughout one's working life. Table 33 below estimates the present value of the total earnings differentials of the 88,676 Arizona-based alumni over their entire working lives, using the following assumptions:

- A working life is 40 years, from age 25 to age 65;
- The average earnings differentials used above remain constant;
- The average earnings differential used is taken from Table 29 above;
- A discount rate of three percent is assumed

Table 33: Estimated Present Value of Lifetime Earnings Differential

	Number	Average Earnings Differential	Estimated Average Annual Earnings Differential	Total Incremental Earnings over 40 years	Present Value of Lifetime Earnings Differentials
<b>2014 Alumni</b>	7,042	\$16,768	\$118,080,256	\$4,723,210,240	\$2,729,398,192
<b>All Alumni in Arizona</b>	88,676	\$16,768	\$1,486,919,168	\$59,476,766,720	\$34,369,797,512

Under these assumptions, the degrees earned by the class of 2014 have an estimated present value of approximately \$3 billion. The degrees held by the entire cohort of 88,676 alumni currently living in Arizona have a present value of approximately \$38 billion.

## State Tax Implications of Expected Earnings

Table 34 below calculates an estimate of the total state taxes paid on 2014 incremental earnings by NAU graduates living in Arizona. The estimate uses earnings differentials for the entire state to assign an average tax rate to each degree level.

Table 34: Estimate of State Taxes Paid on Incremental Earnings by Alumni Living in Arizona, 2014

Degree Held	Expected Annual Average Earnings Differential (Arizona)	Alumni Count	Expected State Tax Rate	Expected Incremental State Income Tax, 2014
<b>Associate's or Some College</b>	\$7,149	210	3.36%	\$50,443
<b>Bachelor's</b>	\$21,870	55,107	4.24%	\$51,100,060
<b>Graduate</b>	\$12,191	33,359	4.24%	\$17,243,214
<b>Total</b>		88,676		\$68,393,717

Note that the \$68 million estimate in Table 34 is approximately 62% of that year's state appropriation to NAU (\$110 million).



## Visitors

In FY14 an estimated 174,000 individual visits were made to the Mountain Campus. Two thirds of this total included visits to students, which were derived from the student survey conducted by AHRRC. According to that instrument, students received, on average, 5.55 visits per year. The average length of stay of these visitors was 2.41 days. Using this data, approximately 13 visitor-days were attributed to each student, yielding a total of 107,000 estimated visits. According to estimates provided by Campus Services, visitation related to new student orientation, camps, homecoming and family weekend, conferences, performances, and other events accounted for approximately 66,000 additional visits.

To estimate the expenditures made by these visitors, preliminary results of the Arizona Hospitality Research and Resource Center's *2013-2014 Flagstaff Visitor Survey* were used. This instrument provided average expenditures in a number of categories that were applied to the visitor estimate. The aggregate expenditure estimates were analyzed using IMPLAN, both to determine contributions to the state and county economies. Table 35 displays the estimated overall contributions to the state and Table 36 shows estimated contributions to Coconino County.

Table 35: Estimated Contributions from Visitor Spending, Statewide

Statewide	Employment	Labor Income	Economic activity
Direct Effect	922	\$29,200,000	\$83,100,000
Multiplier Effects	451	\$21,100,000	\$58,500,000
Total Effect	1372	\$50,300,000	\$141,600,000

Table 36: Estimated Contributions from Visitor Spending, Coconino County

Coconino County	Employment	Labor Income	Economic activity
Direct Effect	938	\$25,600,000	\$80,200,000
Multiplier Effects	255	\$8,200,000	\$24,800,000
Total Effect	1193	\$33,800,000	\$105,000,000

## Retirees

Quantifying retiree spending required first estimating the number and location of NAU retirees living in Arizona. As an official count was unavailable, this number was attained by inflating the number used in the 2010 study, "The Economic Contributions of Northern Arizona University to the State of Arizona in 2010," by 3% per year. The per-retiree spending numbers from that study were also used, and inflated using the consumer price index (CPI) inflation records of 8.3% (2010-2014).

To obtain a more accurate estimate of the effects of retiree spending, a geographical dispersion of retirees was estimated by distributing them to the counties by the ratio of alumni residing in each geographical area.

The estimated retiree spending was then modeled in IMPLAN as a household income change. As with alumni spending, estimated direct retiree spending has been added to these overall contribution tables, to provide a more accurate estimate of how these dollars persist within the economy.

Tables 37-41 show the estimated contributions to the economy caused by retiree spending.

Table 37: Estimated Economic Contributions from Retiree Spending, Statwide

Statewide	Jobs	Economic activity
Direct Effect	324	\$28,400,000
Multiplier Effects	244	\$31,600,000
<b>Total Effect</b>	<b>568</b>	<b>\$60,000,000</b>

Statewide, retiree spending supports an estimated 586 jobs and \$60 million in economic activity.

Table 38: Estimated Economic Contributions from Retiree Spending, Coconino County

Coconino County	Jobs	Economic activity
Direct Effect	65	\$4,300,000
Multiplier Effects	27	\$2,700,000
<b>Total Effect</b>	<b>92</b>	<b>\$7,000,000</b>

In Coconino County, retiree spending supports an estimated 92 jobs and \$7 million in economic activity.

Table 39: Estimated Economic Contributions from Retiree Spending, Maricopa County

Maricopa County	Jobs	Economic activity
Direct Effect	156	\$14,300,000
Multiplier Effects	121	\$15,900,000
<b>Total Effect</b>	<b>277</b>	<b>\$30,200,000</b>

In Maricopa County, retiree spending supports an estimated 277 jobs and \$30 million in economic activity.

Table 40: Estimated Economic Contributions from Retiree Spending, Yuma County

Yuma County	Jobs	Economic activity
Direct Effect	16	\$1,200,000
Multiplier Effects	5	\$600,000
<b>Total Effect</b>	<b>21</b>	<b>\$1,800,000</b>

In Yuma County, retiree spending supports an estimated 21 jobs and \$1.8 million in economic activity.

Table 41: Estimated Economic Contributions from Retiree Spending, Balance of State

Balance of State	Jobs	Economic activity
Direct Effect	98	\$8,600,000
Multiplier Effects	74	\$9,600,000
<b>Total Effect</b>	<b>172</b>	<b>\$18,200,000</b>

In the remainder of the state, retiree spending supports an estimated 172 jobs and \$18 million in economic activity.

### Tax Estimates

IMPLAN also estimates taxes paid based on direct expenditure patterns. A selection of the estimated aggregate state and local tax impacts on the state Arizona is shown in Table 42.

Table 42: Selected State and Local Tax Collection Estimates, FY14

Tax Type	Estimated State and Local Tax Collection, 2014
Sales Tax	\$43,001,932
Property Tax	\$30,238,607
Personal Income Tax	\$8,189,418