

Alliance Bank Economic Policy Institute

## **The Economic Contributions of Northern Arizona University to the State of Arizona in Academic Year 2017 – 2018**

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## Alliance Bank Economic Policy Institute

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## **“Highlights” of Northern Arizona University’s Academic Year 2017-2018 Economic Contribution Study**

### **NAU’s Economic Contribution to the State**

\$2.64 billion in economic activity, over 24,000 jobs

### **NAU’s Economic Contribution to Coconino County**

\$1.96 billion in economic activity, over 19,500 jobs

### **NAU’s Economic Contribution to Maricopa County**

\$189 million in economic activity, over 1,500 jobs

### **NAU’s Economic Contribution to Yuma County**

\$21 million in economic activity, over 200 jobs

### **NAU’s Economic Contribution to All Other Counties**

\$111 million in economic activity, over 900 jobs

### **NAU’s Fiscal Impacts**

\$185 million in state and local taxes

**The Economic Contributions of Northern Arizona University  
to the State of Arizona in Academic Year 2017-2018**

**Executive Summary**

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Since its founding in 1899, Northern Arizona University (NAU), has made a significant and long-term economic impact on the region and the State of Arizona that is clearly reflected in this report. In Academic Year 2017 to 2018 (henceforth, AY17-18), NAU contributed over \$2.6 billion in economic activity and supported more than 24,000 jobs to the state. This data and activities underscore the university’s mission to serve and benefit the community and region.

NAU is an educational and economic anchor for Northern Arizona, offering more than 150 degree programs, and serving a statewide body of over 31,000 students. In addition to the Flagstaff Mountain Campus, nearly 2,300 students earned NAU credit at more than 20 community campuses across the state, and the university’s leading online learning program enrolled over 5,600 students.

This economic contribution study for AY17-18 quantifies the impacts of the annual budget spending that occurs within Arizona and is attributable to the operations of NAU. This analysis includes statewide budget expenditures; off-campus student housing construction driven by enrollment growth; student and visitor spending in Flagstaff; and statewide alumni and retiree spending. The spending patterns of these six categories are 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.

By examining expenditure data provided by NAU, this analysis estimates the amount of economic activity generated in the local, county, and state economy resulting from the university’s existence during AY17-18.

This report does not seek to capture the level of spending that would otherwise be “lost” in the absence of the University’s presence, but rather captures the employment and economic impacts generated as a result of NAU’s existence.

## **NAU's Estimated Impact on the State**

NAU's estimated economic activity has a noticeable impact at the state level. The estimated contribution of NAU in AY17-18 comprised of over \$2.6 billion in economic activity to the state economy and supported more than 24,000 jobs. NAU's economic activity resulted in an estimated \$185 million in state and local tax revenue.

### **Key Components of NAU's Impact on Coconino County**

A majority of NAU's economic activity takes place in Coconino County and makes a substantial contribution to the local economy. Overall, direct university expenditures contributed an estimated \$874 million and more than 8,000 jobs to the county economy in AY17-18. Visitors to NAU contributed a further \$140 million dollars and 1,828 jobs to the county economy. An increase of off-campus student housing construction tied to increasing enrollment added an additional \$278 million and more than 2,000 jobs to the economy.

### **Key Components of NAU's Impact on other Arizona Counties**

NAU has operations at a variety of community colleges and in programs spread through most of Arizona's 15 counties. While none of the satellite programs are as large as the Mountain Campus, NAU's presence in counties outside of Coconino resulted in expenditures that further emphasized NAU's reach to the state. Overall, these university expenditures accounted for approximately \$17 million in additional economic activity in the remaining counties, with Yuma County benefiting from \$10.3 million of this impact.

### **The Estimated Impact of the Students on Coconino and other Arizona Counties**

The estimated contribution of students to the local economy is most keenly felt in Coconino County, where 73% (23,140 students) of all NAU's student enrollment is located. In AY17-18, expenditures in the local economy accounted for an estimated \$493 million in economic activity and supported over 5,000 jobs. Student spending in Maricopa County accounted for \$15 million and supported 150 jobs. Student expenditures in all other counties contributes \$14 million to the counties economies and supports 127 jobs.

### **Key Components of the Estimated Impact of Alumni and Retirees on the State and Counties**

It is estimated that the 7,928 graduating alumni from AY17-18 will contribute an estimated \$222 million annually to the state economy and support 2,167 jobs. The majority (65%) of these graduating alumni live in Maricopa County, contributing approximately \$134 million to that county's economy and supporting 1,174 jobs in AY17-18. During this time, NAU's retirees contributed a further \$69 million to the state economy and support 734 jobs.

## **Estimated Fiscal Impacts of the University on the State and Counties**

NAU-related expenditures, and the secondary revenue and income impacts that result, contribute substantially to state and local taxes in Arizona. NAU-related spending during AY17-18 generated nearly \$185 million in state and local tax revenue, including property taxes (\$17.9 million), corporate income taxes (\$1.7 million), sales taxes (\$59.1 million), and other taxes such as motor-vehicle license and severance taxes.

Overall, the presence of NAU makes a major contribution to state and local tax bases through both large-scale purchases of goods and services and day-to-day spending by NAU's students, faculty, staff, and other affiliates, many of whom would not have made these local purchases nor paid taxes on them "but for" the existence of NAU.



## Introduction

This report seeks to measure the impact of NAU on the State of Arizona's economy specific to AY17-18. The university's economic contributions are separated by Coconino, Maricopa, and Yuma counties, as well as the 12 remaining Arizona counties, henceforth referred to as the Balance of State (BOS). This AY17-18 analysis expands on previous economic impact studies performed by the Alliance Bank Economic Policy Institute.

### The Overall Value of Universities

The impact of universities is observed among individuals and across societies. One of the more obvious aspects of this is the influence a university has on the lives of its students and employees. This is because college graduates tend to receive higher lifetime incomes and face lower unemployment rates. The employment opportunities offered by schools support workers through benefits and income received. However, a university's reach is not limited to those directly involved in its operations.

Higher education institutions also act as significant catalysts of growth and development in the communities and states in which they exist. This can be partly attributed to a university's ability to stimulate growth through various avenues, such as enhancing the quality of human capital, furthering innovation, and increasing demand. For instance, a highly educated workforce increases average income not only for those with degrees, but for all workers in the surrounding region. This illustrates one of the positive externalities a university produces. Universities also increase the supply of available labor in the regions they are located. Many businesses depend on university students and employees as primary sources of labor and technical expertise. Interns and student workers are less skilled than those who have completed degrees and, thus, are generally less expensive to employ. As a result, companies' operating expenses are reduced.

Individuals and societies also benefit from various non-monetary impacts that arise from the presence of a university. One example is the increase in community involvement and cultural awareness observed in areas with a more educated populace. Educated communities are also less reliant on social services and experience reduced crime. Furthermore, higher education institutions offer significant employment opportunities and tend to enhance the general attractiveness of the surrounding region. Universities cultivate an environment encouraging the exchange of knowledge within surrounding areas. This rise in social interaction and flow of ideas supports additional positive externalities and boosts growth in local areas.

Although local regions benefit from a university's presence in numerous ways, there are costs that must also be considered. For example, land and infrastructure owned by most state

universities is tax-exempt. The forgone government revenue will likely be offset through higher taxation on the other properties that exist in the area. Further, if there is inadequate parking available on campus, students and faculty may make use of the parking spaces provided by local neighborhoods and businesses at the expense of residents and consumers. Cities may need to provide additional police and fire protection, as well as expand water and sewer infrastructure. These factors could have negative impacts which are not included in this analysis. As time allows, we plan to expand this study to include such citywide effects.

### **Overview of Northern Arizona University**

Northern Arizona University is a public institution that offers more than 150 degree programs. The main campus (Mountain Campus) is located in Flagstaff and accounts for nearly three-fourths of enrolled students; however, the University also offers education to students online, and through more than 20 campuses across the state. NAU's ongoing initiatives in education, research, and public service promote the advancement of students, employees, and citizens of Arizona.

The University has been expanding. Enrollment grew 12 percent within the previous three academic years, and this trend is expected to continue. In AY17-18, NAU served over 31,000 students, directly employed more than 4,600 workers, and had expenditures over \$580 million.

The State of Arizona benefits from the additional economic activity resulting from the presence of students and visitors, as well as the jobs supported entirely and in-part by NAU. These advances have been amplified as NAU's growth continues to promote opportunities on its campuses and in local areas. For example, the university's operations have contributed to the rise of commercial investment in the community surrounding the Mountain Campus. Off-campus housing projects in Flagstaff, such as the Hub's 591-bed and the Standard's 650-bed apartment complexes, have been developed to meet increased demand for student housing, creating new jobs in the process.

Many university activities also enhance the quality of life for Arizona citizens, such as research and public service endeavors. NAU's athletic and cultural events are another example. Similarly, local public radio programming, along with numerous seminars and workshops are largely attributable to the presence of the university.

### **Measuring Northern Arizona University's Economic Contributions**

Economic contributions of this study are based on inputs from university capital and operation expenditures, and off-campus housing construction (driven by enrollment growth). In addition,

employee, student, visitor, and alumni spending contributes to the overall impact. Retiree spending is also included in the analysis as retirees' residency in the state can be partly attributed to their prior employment at the university. NAU's total impact is greater than the economic activity and job creation initially produced. This is because of the "multiplier effect".

The multiplier effect is observed as spending leads to additional income within a region's economy (hence more spending). This process continues, generating new jobs and causing ripple effects in the local economy. The multiplier effect also works in reverse. When spending declines in an area, ripple effects generate additional reductions in the region's level of economic activity and employment. To illustrate, a multiplier of 2.00 means that \$1 million of direct spending results in \$2 million in total economic activity. Thus, the initial spending contributes an additional \$1 million in expenditures. Similarly, if spending were to decrease by \$1 million, there would be a \$2 million drop in overall economic activity in that area.

Although this study models the positive effects of NAU to the state and local economies, another way to think about this would be to consider the negative effects that would occur if the university was not in existence (if it closed down, for example). If this occurred, neighboring economies would be affected as these expenditures would vanish. For example, local hotel and restaurants' revenues would drastically decline. Banking, insurance, and other services would also experience reduced sales and activities. Moreover, the decreased supply of student workers and interns would increase operating costs for firms in the region as they are driven to replace relatively inexpensive workers with more expensive ones. The quality-of-life activities previously described would also be negatively impacted, and the region's physical infrastructure would most likely shrink.

## **Methodology**

This study employs IMPLAN (Impact Analysis for Planning), a widely-accepted input-output model, to approximate the economic contributions of NAU across local and neighboring economies. NAU's total contributions are derived from the university's expenditures, off-campus housing construction, as well as spending by employees, students, visitors, and retirees. The differential earnings the hypothetical graduating class of AY17-18 are included in the model. The total impact is the summation of the following three effects: direct (or initial), indirect, and induced. This report combines the indirect and induced effects, referring to them as "multiplier effects" for simplicity.

The model only accounts for monetary effects, as non-monetary impacts are especially difficult to quantify. For instance, the positive societal impacts attributable to NAU that were previously outlined—such as increased diversity and cultural activities—are not considered. The impacts

associated with any significant discoveries stemming from faculty and student research are also ignored. This is because the university's influence is usually too ambiguous to reasonably estimate. Thus, the intrinsic value of the total impact is not fully captured in the IMPLAN estimates.

The methodology used in this study also allows us to estimate the return on investment of Arizona state appropriations in AY17-18. **Every \$1 of state appropriations in AY17-18 returned an estimated \$24.20 in economic activity and generated \$1.72 in state and local taxes.**

Expenditure data is modeled to estimate the university's overall economic impact in five regions: the State of Arizona, Coconino, Maricopa, and Yuma counties, and BOS. As such, different models were constructed to illustrate the economic contributions on a statewide level, isolating the impacts to the state and also the regions within it. Identifying economic contributions essentially quantifies spending and job creation/support that is attributable to the university. This report lists those effects in terms of jobs, labor income, and economic activity.

The models are primarily based on the following monetary effects: university operations and capital expenditures, student and visitor expenditures, and off-campus construction expenditures due to enrollment growth. Retiree spending and the earning differentials of the AY17-18 graduating class are included in the model.

The economic activity supported by each of these activities are discussed and presented in the following sections of this report in terms of employment, labor income, and total economic activity. The overall contributions in each region were compiled by summing the impacts generated by each of the six spending groups.

The totals reported for the four regional models (Coconino, Maricopa, Yuma, and BOS) will not equal the Arizona overall numbers. This is because regional impacts ignore spending that occurs out of that region.

## Estimated Overall Contributions

The following are the IMPLAN estimates. In cases where multiple areas are covered, the typical order is: State of Arizona, Coconino County, Maricopa County, Yuma County, and BOS. The overall estimated impacts of each source is initially listed by region. The sources of each region’s economic activity will then be discussed in greater detail, separating the direct and multiplier effects. For this study, “alumni” refers to the hypothetical graduating class of AY17-18.

### Estimated Overall Contributions in the State of Arizona

Total estimated contributions to the Arizona economy by source in AY17-18 was:

<b>University Expenditures</b>	<b>\$922 million and 9,079 jobs</b>
Capital Expenditures	\$188 million and 1,648 jobs
Off Campus Construction	\$339 million and 2,453 jobs
Students	\$720 million and 6,663 jobs
Alumni	\$222 million and 2,167 jobs
Visitors	\$182 million and 1,989 jobs
Retirees	\$69 million and 734 jobs
<b>Total Statewide Contributions:</b>	<b>\$2,642 million and 24,733 jobs</b>

### Estimated Overall Contributions in Coconino County

Total estimated contributions to the Coconino County economy by source in AY17-18 was:

<b>University Expenditures</b>	<b>\$874 million and 8,667 jobs</b>
Capital Expenditures	\$142 million and 1,236 jobs
Off Campus Construction	\$278 million and 2,169 jobs
Students	\$493 million and 5,745 jobs
Alumni	\$18 million and 212 jobs
Visitors	\$140 million and 1,828 jobs
Retirees	\$8 million and 141 jobs
<b>Total Contributions to Coconino County:</b>	<b>\$1,953 million and 19,998 jobs</b>

### Estimated Overall Contributions in Maricopa County

Total estimated contributions to the Maricopa County economy by source in AY17-18 was:

<b>University Expenditures</b>	<b>\$4 million and 30 jobs</b>
Students	\$15 million and 150 jobs
Alumni	\$134 million and 1,174 jobs
Retirees	\$36 million and 224 jobs
<b>Total Contributions to Maricopa County:</b>	<b>\$189 million and 1,577 jobs</b>

### Estimated Overall Contributions in Yuma County

Total estimated contributions to the Yuma County economy by source in AY17-18 was:

<b>University Expenditures</b>	<b>\$11 million and 95 jobs</b>
Students	\$3 million and 26 jobs
Alumni	\$4 million and 52 jobs
Retirees	\$3 million and 41 jobs
<b>Total Contributions to Yuma County:</b>	<b>\$21 million and 214 jobs</b>

### Estimated Overall Contributions in the Balance of the State

Total estimated contributions to the Balance of State economy by source in AY17-18 was:

University Expenditures	<b>\$3 million and 36 jobs</b>
Students	\$11 million and 101 jobs
Alumni	\$76 million and 697 jobs
Retirees	\$21 million and 152 jobs
<b>Total Contributions to Balance of State:</b>	<b>\$111 million and 986 jobs</b>

## Calculation of Impacts

Tables 1 and 2 list the total impacts by source and geographical area. Table 1 itemizes the regions and sources of the estimated total economic activity, which is a measure of NAU’s total contribution in AY17-18 (in 2017 dollars). Table 2 lists the total estimated jobs supported by NAU in this same time period.

**Table 1: Estimated AY17-18 total contributions, economic activity**

Total Estimated Contributions (in \$1,000)								
Region	Operations	Capital	Off Campus Construction	Students	Visitors	Retirees	Alumni	Total
Statewide	\$922,000	\$188,000	\$339,000	\$720,000	\$182,000	\$69,000	\$222,000	\$2,642,000
Coconino County	\$874,000	\$142,000	\$278,000	\$493,000	\$140,000	\$8,000	\$18,000	\$1,953,000
Maricopa County	\$4,000	NA	NA	\$15,000	NA	\$36,000	\$134,000	\$189,000
Yuma County	\$11,000	NA	NA	\$3,000	NA	\$3,000	\$4,000	\$21,000
Balance of State	\$3,000	NA	NA	\$11,000	NA	\$21,000	\$76,000	\$111,000

**Table 2: Estimated AY17-18 total contributions, jobs**

Total Estimated Job Contributions								
Region	Operations	Capital	Off campus construction	Students	Visitors	Retirees	Alumni	Total
Statewide	9,079	1,648	2,453	6,663	1,989	734	2,167	24,733
Coconino County	8,667	1,236	2,169	5,745	1,828	141	212	19,998
Maricopa County	30	NA	NA	150	NA	224	1,174	1,578
Yuma County	95	NA	NA	26	NA	41	52	214
Balance of State	36	NA	NA	101	NA	152	697	986

## Operations Budget

Operational spending data was provided by the University Budget Office. Total AY17-18 expenditures of approximately \$588 million were analyzed using IMPLAN. The total estimated economic contribution of this level of university expenditure in AY17-18 was approximately \$922 million across the state. This level of activity supported an estimated 9,079 jobs, providing \$458 million in labor income. Table 3 shows the estimates of these contributions to the state.

**Table 3: Estimated AY17-18 Contributions of Operations Budget, Statewide**

Statewide	Employment	Labor Income	Economic Activity
<b>Direct Effect</b>	6,352	\$365,011,000	\$588,435,000
<b>Multiplier Effects</b>	2,728	\$93,552,000	\$332,688,000
<b>Total Effect</b>	9,079	\$458,562,000	\$921,122,000

Tables 4 through 7 define the contribution estimates of the operations budgets with respect to the regions in which they occurred. Budget expenditures were allocated by geographic area using ratios taken from allocations of state and local funding.

In Coconino County, operation expenditures contributed an estimated \$874 million and 8,667 jobs to the local economy (see Table 4).

**Table 4: Estimated AY17-18 Contributions of Operations Budget, Coconino County**

Coconino County	Employment	Labor Income	Economic Activity
<b>Direct Effect</b>	6,038	\$353,347,000	\$553,672,000
<b>Multiplier Effects</b>	2,629	\$89,810,000	\$320,218,000
<b>Total Effect</b>	8,667	\$443,157,000	\$873,890,000

In Maricopa County, operations expenditures contributed approximately \$4 million and 30 jobs to the local economy (see Table 5).

**Table 5: Estimated AY17-18 Contributions of Operations Budget, Maricopa County**

Maricopa County	Employment	Labor Income	Economic Activity
<b>Direct Effect</b>	17	\$986,000	\$1,951,000
<b>Multiplier Effects</b>	13	\$620,000	\$1,989,000
<b>Total Effect</b>	30	\$1,605,000	\$3,939,000



In Yuma County, operations expenditures contributed an estimated \$10 million and 95 jobs to the local economy (see Table 6).

**Table 6: Estimated AY17-18 Contributions of Operations Budget, Yuma County**

Yuma County	Employment	Labor Income	Economic Activity
<b>Direct Effect</b>	54	\$2,170,000	\$5,205,000
<b>Multiplier Effects</b>	41	\$1,481,000	\$5,075,000
<b>Total Effect</b>	95	\$3,650,000	\$10,280,000

In the remaining counties, operations expenditures contributed an estimated \$2.7 million and 36 jobs to the economy (see Table 7).

**Table 7: Estimated AY17-18 Contributions of Operations Budget, Balance of State**

Balance of state	Employment	Labor Income	Economic Activity
<b>Direct Effect</b>	25	\$570,000	\$1,366,000
<b>Multiplier Effects</b>	11	\$388,000	\$1,332,000
<b>Total Effect</b>	36	\$958,000	\$2,698,000

These expenditures were funded by a variety of sources. Among these was a state appropriation of approximately \$108,612,800, (source [www.azleg.gov/jlbc/18AR/uninau.pdf](http://www.azleg.gov/jlbc/18AR/uninau.pdf)).

## Capital Budget

Capital expenditures for projects like the new infrastructure, buildings and upgrades as well as numerous maintenance and repair projects, occurred almost exclusively on the Mountain Campus. A small number of capital projects were undertaken in Yuma County. These impacts were modeled using IMPLAN for these counties and for the overall impact on the state. Tables 8 through 10 show the estimated contributions of capital expenditures in AY17-18.

Statewide, capital expenditures contributed approximately \$189 million and 1,648 jobs to the economy (see Table 8).

**Table 8: Estimated AY17-18 Contributions of Capital Budget, Statwide**

Statewide	Employment	Labor Income	Economic Activity
Direct Effect	1,252	\$46,655,000	\$139,053,000
Multiplier Effects	396	\$14,968,000	\$49,879,000
Total Effect	1,648	\$61,622,000	\$188,932,000

In Coconino County, capital expenditures contributed approximately \$142 million and 1,236 jobs to the economy (see Table 9).

**Table 9: Estimated AY17-18 Contributions of Capital Budget, Coconino County**

Coconino County	Employment	Labor Income	Economic Activity
Direct Effect	939	\$34,991,000	\$104,290,000
Multiplier Effects	297	\$11,226,000	\$37,409,000
Total Effect	1,236	\$46,217,000	\$141,699,000

Capital expenditures in Yuma County were almost inconsequential, but contributed around \$53,000 and supported a portion of a job (see Table 10).

**Table 10: Estimated AY17-18 Contributions of Capital Budget, Yuma County**

Yuma County	Employment	Labor Income	Economic Activity
Direct Effect	0.3	\$11,000	\$37,000
Multiplier Effects	0.2	\$6,000	\$16,000
Total Effect	0.5	\$16,000	\$53,000

Construction budgets can change drastically from year to year. While these estimates use actual spending from AY17-18, they are not necessarily representative of what happens every year. For example, in Fiscal Year (FY) 2013, 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. Through FY2019, an average of \$58 million in construction spending per year is planned.

### **Off-campus Student Housing Construction**

Flagstaff saw an increase in the construction of off-campus student housing between 2015 and 2017, with more construction slated for the future. While this construction is not a university expenditure, it can be argued that the NAU is directly responsible for these local construction expenditures. Without the presence of NAU, these outside entities would not have built all the extra housing geared towards students in the community. Approximately \$186 million was spent on constructing of four off-campus student housing projects in Coconino County. The contribution of the construction is considered to have taken place during the period 2016-2018 and is a one-time contribution to the local economy. All future planned projects will be considered contributions to the local economy in the years that they are built.

In AY17-18, off-campus student housing construction contributed approximately \$339 million to the state economy and supported 2,453 jobs. Coconino County accounted for the majority of these contributions, with approximately \$278 million and 2,169 jobs added to the region’s economy.

Tables 11 and 12 show these estimated economic contributions of off-campus student housing construction to the state and Coconino County, respectively.

**Table 11: Off-campus student housing construction AY17-18 impact, Statewide**

Statewide	Employment	Labor Income	Economic Activity
<b>Direct Effects</b>	1,470	\$73,924,000	\$187,775,000
<b>Multiplier Effects</b>	983	\$49,467,000	\$150,845,000
<b>Total Effects</b>	2,453	\$123,391,000	\$338,619,000

**Table 12: Off-campus student housing construction AY17-18 impact, Coconino County**

Coconino County	Employment	Labor Income	Economic Activity
Direct Effects	1,279	\$48,740,000	\$186,000,000
Multiplier Effects	890	\$29,393,000	\$92,397,000
Total Effects	2,169	\$78,132,000	\$278,397,000

## Students

The contributions are based on Flagstaff Mountain Campus student spending. These estimates use the Fall Semester, 2017, headcount from the 2017 PAIR Report Factbook.

Student expenditures were estimated using a survey distributed and analyzed by the Arizona Hospitality Research and Resource Center (AHRRC) specifically for a similar study conducted in 2015. The AHRRC distributed surveys through email to the 19,320 students attending the Flagstaff Mountain Campus at the time it was conducted, and questions were primarily regarding personal expenditures in the region. The survey had a response rate of nearly 14 percent, with 2,605 responses. The results were adjusted for inflation and used as a proxy for student spending in AY17-18.

The results indicated that the average student living in Flagstaff spends an estimated \$22,585 in the county, excluding direct payments to the university.

Tables 13 shows the estimated economic contributions on the state linked to Flagstaff student spending in AY17-18. Statewide, students spent enough money to support 6,663 jobs and stimulate \$719 million in economic activity.

**Table 13: Mountain Campus Student Spending AY17-18 Contributions, Statewide**

Statewide	Employment	Labor Income	Economic Activity
Direct Effect	4,317	\$129,078,000	\$382,792,000
Multiplier Effects	2,346	\$107,880,000	\$336,557,000
Total Effect	6,663	\$236,958,000	\$719,349,000

Table 14 lists the contributions to Coconino County’s economy only. Students on the Flagstaff campus spent enough money to support an estimated 5,744 jobs and \$493 million in economic activity.

**Table 14: Mountain Campus Student Spending Contributions, Coconino County**

Mountain Campus	Employment	Labor Income	Economic Activity
<b>Direct Effect</b>	4,389	\$118,584,000	\$328,580,000
<b>Multiplier Effects</b>	1,355	\$46,138,000	\$164,230,000
<b>Total Effect</b>	5,744	\$164,721,000	\$492,810,000

Note that the direct economic activity in Tables 13 and 14 is less than the total number of students multiplied by the average per-student expenditure. This is because IMPLAN considers direct effects associated with retail purchases as only the retail sales margin. The difference, approximately \$193 million, is considered immediate leakage, and leaves the county economy before stimulating further spending.

The university’s growth is expected to continue on an upward trajectory as the Arizona Board of Regents has set a goal to increase enrollment on the Flagstaff Mountain Campus to 25,000 students by 2020. Achieving this goal would require enrolling 1,860 additional students within the next two years, as Mountain Campus enrollment in the fall of 2018 was already 23,140.

Applying the spending patterns from above to this expected increase of 1,860 students suggests that direct student spending will increase by that year by approximately \$42 million. Obviously, with the multiplier effect, the additional impact to the economy would be significant.

**Earnings differentials**

College education is still a significant and quantifiable positive investment. Individuals benefit from the resulting financial, vocational, and intellectual advantages. Society also 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 are derived from the U.S. Census Bureau’s 2017 1-Year Estimates, 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>	\$36,923	\$35,516	\$30,673	\$39,934
<b>Less than high school graduate</b>	\$22,121	\$20,073	\$19,029	\$23,159
<b>High school graduate (includes equivalency)</b>	\$28,821	\$29,112	\$25,222	\$30,409
<b>Some college or associate's degree</b>	\$35,802	\$31,765	\$35,768	\$37,485
<b>Bachelor's degree</b>	\$51,197	\$40,582	\$36,991	\$54,818
<b>Graduate or professional degree</b>	\$65,573	\$52,990	\$60,203	\$69,689

**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>	\$6,981	\$2,653	\$7,076	\$10,546
<b>Bachelor's Degree</b>	\$15,395	\$8,817	\$17,333	\$1,223
<b>Graduate or Professional Degree</b>	\$14,376	\$12,408	\$14,871	\$23,212

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

### **Alumni Incremental Earnings and Economic Contributions**

Applying the same differentials used above to AY17-18 graduate numbers provides the expected annual earning potential for this specific graduating cohort. These increased earnings have been analyzed using IMPLAN to estimate how this graduating cohort (the university's "output") will impact 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 (assuming the graduating class stays in state);
- Incremental earnings are as indicated by the 2017 1-Year Estimates, American Community Survey;
- Spending is analyzed as a Household Income change using IMPLAN.

The expected annual earnings differential of AY17-18 graduates under these assumptions are shown by region in Tables 17-21. The aggregate earnings differential statewide is estimated to be \$102 million (see Table 17).

**Table 17: Alumni Estimated Annual Earnings Differential, Statewide**

	Count	Average Earnings Differential	Aggregate Earnings Differential
<b>Total, Statewide</b>	7,928	\$12,900	\$102,270,000

In Coconino County, the aggregate earnings differential is estimated to be \$10.2 million (see Table 18).

**Table 18: Alumni Estimated Annual Earnings Differential, Coconino County**

Coconino County			
Highest Degree Attained	Count	Earnings Differential by Degree (average)	Aggregate Earnings Differential
Associate's or Some College	143	\$3,931	\$561,010
Bachelor's	1,020	\$7,087	\$7,228,784
Graduate	157	\$15,003	\$2,361,784
<b>Total</b>	1,320		\$10,151,380

The aggregate earnings differential is estimated to be \$56.4 in Maricopa County (see Table 19), reflecting the large amount of graduates residing in Maricopa County.

**Table 19: Alumni Estimated Annual Earnings Differential, Maricopa County**

Maricopa County			
Highest Degree Attained	Count	Earnings Differential by Degree (average)	Aggregate Earnings Differential
Associate's or Some College	289	\$7,197	\$2,077,054
Bachelor's	2,829	\$15,521	\$43,903,428
Graduate	744	\$13,972	\$10,391,844
<b>Total</b>	3,861		\$56,372,326

The aggregate earnings differential in Yuma County is smaller and is estimated to be \$2.8 million (see Table 20).

**Table 20: Alumni Estimated Annual Earnings Differential, Yuma County**

Yuma County			
Highest Degree Attained	Count	Earnings Differential by Degree (average)	Aggregate Earnings Differential
Associate's or Some College	10	\$7,798	\$74,192
Bachelor's	242	\$8,120	\$1,966,702
Graduate	56	\$14,194	\$792,788
<b>Total</b>	<b>308</b>		<b>\$2,833,682</b>

The remainder of the state had an aggregate earnings differential estimated to be \$32.9 million (see Table 21).

**Table 21: Alumni Estimated Annual Earnings Differential, Balance of State**

Balance of State			
Highest Degree Attained	Count	Earnings Differential by Degree (average)	Aggregate Earnings Differential
Associate's or Some College	225	\$6,678	\$1,503,695
Bachelor's	1,807	\$14,583	\$26,353,963
Graduate	407	\$12,419	\$5,054,078
<b>Total</b>	<b>2,439</b>		<b>\$32,911,737</b>

The estimated aggregate earnings differentials calculated in Tables 17-21 were analyzed as household income changes using IMPLAN models specific to each geographical region. The results, shown in Table 22, provide an estimate of how the increased earning potential of graduates in each region contributed to the overall economy in AY17-18.

**Table 22: Alumni Estimated Annual Impacts of Spending**

Geographic Area	Estimated Alumni Count	Estimated Aggregate Income	Jobs Supported	Labor Income Supported	Total Economic activity Stimulated
Statewide	7,928	\$102,270,000	951	\$43,215,000	\$118,746,000
Coconino County	1,320	\$10,152,000	66	\$2,379,000	\$7,871,000
Maricopa County	3,861	\$56,373,000	534	\$25,889,000	\$77,054,000
Yuma County	308	\$2,834,000	15	\$553,000	\$1,021,000
<b>Balance of State</b>	<b>2,439</b>	<b>\$32,912,000</b>	<b>306</b>	<b>\$13,908,000</b>	<b>\$43,087,000</b>

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



Tables 23 through 27 list total contribution estimates by geography, including estimated economic activity and jobs supported. Statewide, AY17-18 graduate spending will contribute an estimated \$221 million in economic activity and supported 2,167 jobs. See Table 23.

**Table 23: Estimated Annual Economic Contributions of Alumni Spending, Statewide**

Statewide	Jobs	Economic activity
Direct Effect	1,216	\$102,270,000
Multiplier Effects	951	\$118,746,000
<b>Total Effect</b>	<b>2,167</b>	<b>\$221,015,000</b>

In Coconino County, AY17-18 graduate spending will contribute an estimated \$18 million, supporting 212 jobs. See Table 24.

**Table 24: Estimated Annual Economic Contributions of Alumni Spending, Coconino County**

Coconino County	Jobs	Economic activity
Direct Effect	146	\$10,152,000
Multiplier Effects	66	\$7,871,000
<b>Total Effect</b>	<b>212</b>	<b>\$18,022,000</b>

In Maricopa County, AY17-18 graduate spending will contribute an estimated \$133 million, supporting 1,174 jobs. See Table 25.

**Table 25: Estimated Annual Economic Contributions of Alumni Spending, Maricopa County**

Maricopa County	Jobs	Economic activity
Direct Effect	640	\$56,373,000
Multiplier Effects	534	\$77,054,000
<b>Total Effect</b>	<b>1,174</b>	<b>\$133,426,000</b>

In Yuma County, AY17-18 graduate spending will contribute an estimated \$3.8 million, supporting 52 jobs. See Table 26.

**Table 26: Estimated Annual Economic Contributions of Alumni Spending, Yuma County**

Yuma County	Jobs	Economic activity
Direct Effect	37	\$2,834,000
Multiplier Effects	15	\$1,021,000
<b>Total Effect</b>	<b>52</b>	<b>\$3,855,000</b>

In the remaining counties, AY17-18 graduate spending will contribute an estimated \$76 million, supporting 697 jobs. See Table 27.

**Table 27: Estimated Annual Economic Contributions of Alumni Spending, Balance of State**

Balance of State	Jobs	Economic activity
Direct Effect	391	\$32,912,000
Multiplier Effects	306	\$43,087,000
<b>Total Effect</b>	<b>697</b>	<b>\$75,999,000</b>

### Visitors

In AY17-18, an estimated 206,665 individual visits were made to the Mountain Campus. Visits to students accounted for an estimated 15% of this total, which was derived from the student survey conducted by AHRRC. According to that instrument, students received 5.55 visits per year on average. 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 22,665 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 184,000 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 and adjusted for inflation to reflect 2017 dollars. 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 28 displays the estimated overall contributions to the state, and Table 29 shows estimated contributions to Coconino County.

**Table 28: Estimated Contributions from Visitor Spending, Statewide**

Statewide	Employment	Labor Income	Economic activity
Direct Effect	1,385	\$42,301,000	\$94,507,000
Multiplier Effects	605	\$28,026,000	\$86,668,000
<b>Total Effect</b>	<b>1,989</b>	<b>\$70,326,000</b>	<b>\$181,174,000</b>

**Table 29: Estimated Contributions from Visitor Spending, Coconino County**

Coconino County	Employment	Labor Income	Economic activity
Direct Effect	1,448	\$40,525,000	\$94,507,000
Multiplier Effects	380	\$13,161,000	\$44,740,000
Total Effect	1,828	\$53,686,000	\$139,246,000

## 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 13.5% (2010-2017).

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 30 through 34 show the estimated contributions to the economy caused by retiree spending. Statewide, retiree spending supported an estimated 734 jobs and \$69 million in economic activity in AY17-18 (see Table 30).

**Table 30: Estimated AY17-18 Economic Contributions from Retiree Spending, Statwide**

Statewide	Jobs	Economic activity
Direct Effect	458	\$29,692,000
Multiplier Effects	276	\$38,871,000
Total Effect	734	\$68,562,000

In AY17-18, retiree spending supported an estimated 141 jobs and \$8 million in economic activity in Coconino County (see Table 31).

**Table 31: Estimated AY17-18 Economic Contributions from Retiree Spending, Coconino County**

Coconino County	Jobs	Economic activity
Direct Effect	111	\$4,496,000
Multiplier Effects	29	\$3,466,000
<b>Total Effect</b>	<b>141</b>	<b>\$7,961,000</b>

In Maricopa County, retiree spending supported an estimated 224 jobs and \$35 million in economic activity (see Table 32).

**Table 32: Estimated AY17-18 Economic Contributions from Retiree Spending, Maricopa County**

Maricopa County	Jobs	Economic activity
Direct Effect	82	\$14,971,000
Multiplier Effects	142	\$20,463,000
<b>Total Effect</b>	<b>224</b>	<b>\$35,433,000</b>

Retiree spending supported an estimated 41 jobs and \$2 million in economic activity in Yuma County during AY17-18 (see Table 33).

**Table 33: Estimated Economic Contributions from Retiree Spending, Yuma County**

Yuma County	Jobs	Economic activity
Direct Effect	35	\$1,217,000
Multiplier Effects	7	\$810,000
<b>Total Effect</b>	<b>41</b>	<b>\$2,026,000</b>

In the remainder of the state, retiree spending accounted for an estimated 152 jobs and \$21 million in economic activity (see Table 34).

**Table 34: Estimated Economic Contributions from Retiree Spending, Balance of State**

Balance of State	Jobs	Economic activity
Direct Effect	74	\$9,010,000
Multiplier Effects	84	\$11,796,000
<b>Total Effect</b>	<b>152</b>	<b>\$20,806,000</b>

## Tax Estimates

NAU-related expenditures, and the secondary revenue and income impacts that result, contribute substantially to state and local taxes in Arizona. NAU-related spending during the 2017-2018 academic year generated nearly \$185 million in state and local tax revenue, including property taxes (\$17.9 million), corporate income taxes (\$1.7 million), sales taxes (\$59.1 million), and other taxes such as motor-vehicle license and severance taxes.

Overall, the presence of NAU and its operations make a major contribution to state and local tax bases through both large-scale purchases of goods and services and day-to-day spending by NAU's students, faculty, staff, and other affiliates, many of whom would not have made these local purchases nor paid taxes on them "but for" the existence of NAU. Fiscal impacts were estimated by IMPLAN based on direct expenditure patterns. A selection of the estimated aggregate state and local tax impacts on the state Arizona is shown in Table 35.

**Table 35: Selected State and Local Tax Collection Estimates, 2017-2018**

	Sales Tax	State	Federal
NAU Operations	\$18,894,227	\$44,913,727	\$115,974,952
NAU Capital plus Construction	\$2,067,398	\$4,488,165	\$8,867,853
Flagstaff Student Housing Construction	\$8,306,786	\$17,089,839	\$25,937,745
Student Spending	\$18,665,040	\$37,767,373	\$56,559,329
Retirees	\$1,044,411	\$2,098,273	\$3,066,172
2017 Alumni Spending	\$3,597,411	\$7,227,380	\$10,561,249
Visitor Spending	\$6,432,632	\$12,586,588	\$15,926,083
<b>Total Taxes</b>	<b>\$59,007,905</b>	<b>\$126,171,345</b>	<b>\$236,893,383</b>

## Conclusion

Higher education institutions are key drivers of socio-economic advancement in the regions in which they exist. This is mainly due to universities' ability to stimulate growth through the educational and employment opportunities provided to surrounding areas.

This analysis provides an estimate of the various positive and significant economic contributions of NAU to local, regional, and state economies. These economic contributions are achieved through the university's efforts in academia, research, and public service throughout more than 20 campuses. NAU's operations and existence increase expenditures in the regions surrounding these campuses. The direct impacts of this spending stimulates economic activity and provides jobs to the state. These are then furthered through the multiplier effect. Therefore, NAU's total contributions are much greater than its direct expenditures. In addition, NAU benefits communities in ways that are immeasurable, such as through positive societal impacts and cultural influences. While non-monetary impacts were not included in the analysis, the lives of Arizona citizens are undoubtedly improved as a result.

This study estimates that **NAU contributes over \$2.64 billion in economic activity and generates over 24,000 jobs to the state of Arizona.** In addition, **every \$1 of NAU's state appropriations in AY17-18 returned \$24.20 in economic activity and generated \$1.72 in state and local taxes.** Though these returns on investment are significant, when considering the improvement in the quality of life of students, employees, and Arizona citizens, the true impact of NAU greatly transcends these estimates.

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