

# National Service Universities

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Arizona State University and The Fifth Wave of  
American Higher Education

A working document by

**Michael M. Crow**

President, Arizona State University

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**National Service Universities** aspire to **accelerate positive social** outcomes through the seamless integration of **cutting-edge technological innovation and scalability** with institutional cultures dedicated to the advancement of **academic enterprise and public value.**

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As the nation has grown to span the continent with a population of more than 325 million, America has evolved into a diverse and complex society reflective of a broad set of ideals and core values. Since the seventeenth century, colleges and universities with increasingly complex, and still evolving, institutional models have emerged to meet the needs of society, and this sort of institutional evolution will in all likelihood continue. It is likely, in fact, that this evolution will continue indefinitely as knowledge enterprises morph and adapt to the cultural, economic, political, and social changes that our society will inevitably experience. While higher education was not feature prominently in the U.S. Constitution, it was a topic of consequence and passion for the architects of the early American republic.

John Adams articulated the societal imperative for higher education in Chapter 5, Section 2, of the Massachusetts Constitution, ratified in June 1780, which served as the foundational document for all subsequent state constitutions. This document specified the precept that institutions that nurture the arts and sciences are integral to democracies.

**“** *Wisdom and knowledge, as well as virtue, diffused generally among the body of the people, being necessary for the preservation of their rights and liberties; and as these depend on spreading the opportunities and the advantages of education in the various parts of the country, and among the different orders of the people, it shall be the duty of legislatures and magistrates, in all future periods of this commonwealth, to cherish the interests of literature and the sciences, and all seminaries of them, especially the university at Cambridge.”*



— **John Adams**  
Chapter 5, Section 2,  
Constitution of the Commonwealth  
of Massachusetts ratified June 1780

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In 1790, in his first annual message to Congress after having been elected President of the United States, George Washington made the case that the existing American academies were too limited to meet the needs of the nation. Washington suggested the establishment of a national university as one possible remedy. Despite repeated efforts through the late eighteenth and early nineteenth centuries to establish such a preeminent institution, no lasting plan for a national university materialized. Inspired in part by this rich history and empowered by emerging technologies and a trajectory of continuous innovation, a subset of large-scale public research universities have the potential to constitute a de facto — or virtual — national university. With their unique positions, these national universities could provide a critical social and economic benefit to our country. Accordingly, these national universities are perhaps better characterized as National Service Universities.

“ Nor am I less persuaded that you will agree with me in the opinion that there is nothing which can better deserve your patronage than the promotion of science and literature. Knowledge is in every country the surest basis of public happiness. Whether this desirable object will be best promoted by affording aids to seminaries of learning already established, by the institution of a national university, or by any other expedients, will be well worthy of a place in the deliberations of the legislature.”

— **George Washington**  
First Annual Message to Congress  
January 1790



## The First Wave

### America's Greek Academies

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**The First Wave** in American higher education initially comprised a small number of what were then denominationally affiliated institutions chartered before the founding of the Republic. Nine colonial colleges, beginning with Harvard (1636), William and Mary (1693), Yale (1701), and the schools that would become Princeton (1746), Columbia (1754), Penn (1755), Brown (1764), Rutgers (1766) and Dartmouth (1769), were established to transmit a classical curriculum suitable for young gentlemen from propertied families preparing to enter the ministry and the professions.

## The Second Wave

### America's State-Chartered Colleges and Universities

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As the population of the young American Republic grew, the small denominationally affiliated academies of the First Wave proved to be insufficient in both scope and scale. Initially in the South, new nondenominational variants of these colleges were chartered by the various states in the late eighteenth and early nineteenth centuries.

**The Second Wave** schools, beginning with the University of Georgia (1785), University of North Carolina (1789), University of Vermont (1791), University of South Carolina (1801), University of Michigan (1817), and University of Virginia (1819), began to enlarge the curriculum beyond the classics, philosophy, and theology.

## The Third Wave

### America's Land-Grant Colleges and Universities

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In the 1850s, Vermont Congressman Justin Morrill argued for public investment at the national level to build universities “accessible to all, but especially to the sons of toil,” that is to say, serving the children of farmers and laborers. His legislation was enacted into law by President Abraham Lincoln in 1862, during the midst of the Civil War, at a moment when the Union’s victory was not assured. Land owned by the federal government was made available to each of the states to sell to build at least one college. This became the system of land-grant colleges and universities, and many of the institutions that emerged **with the Third Wave** became the leading public universities of their respective states. American higher education in the mid-nineteenth century was defined by the increasing prominence of schools that emerged during this Third Wave and were ultimately empowered by the Land Grant Act of 1862. Some schools were started in concert with this general approach, and others evolved as a function of the Act.

# The Fourth Wave

## America's Research Universities

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By the end of the nineteenth century, America witnessed the emergence of the set of institutions that constitute the **Fourth Wave**, a hybrid of the British and German academic models, which combines a focus on undergraduate education with advanced scientific research and graduate education. The Fourth Wave would dominate American higher education throughout the twentieth century. In Baltimore, one of the leading cities of the day, Johns Hopkins University was established in 1876 based on the model of the German research university, which emphasized advanced scientific research. By wide consensus, Johns Hopkins is regarded as the prototype for the American research university.

## Summary

### America's Proven Capacity to Perpetually Adapt

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Each of the four waves has represented a unique set of adaptations. In **Wave One**, small denominational colleges based on the British academic model focused on a classical curriculum and preparation for the ministry for sons of the social elite and remained isolated from society. In **Wave Two**, state-chartered public colleges and universities educated nineteenth century social elites but eventually brought accessibility to a broader demographic. In **Wave Three**, a democratic model of egalitarian access with a regional and industrial focus was developed to meet the needs of the working and middle classes as well as agriculture and industry. But America's most significant institutional innovation in this context was the **Fourth Wave**, the set of research universities that defined the "academic gold standard" in American higher education.

# National Service Universities

## The Fifth Wave

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As the twenty-first century progresses, the **Fifth Wave** could emerge as a subset of public universities or networks of public and private universities endowed with sufficient capacity to offer broad accessibility to learning environments of world-class knowledge production dedicated to societal scale outcomes—institutions that are sociotechnologically integrated, scalable, complex adaptive knowledge enterprises. Termed "National Service Universities" these new institutions will address many of the core educational challenges faced by American higher education in the twenty-first century by adding a new organizational type to augment the existing types. In recent years, the federal government and various state governments have established commitments to achieve for our nation a return to the highest rates of educational attainment in the world. However, our current models operate under serious limits to growth. Increasing the post-secondary degree attainment rate would require systematic improvements throughout the entire education pipeline — including the high school graduation rates, the college-going rates, and the two- and four-year college graduation rates. Within this context, attaining a 50 percent post-secondary degree attainment rate among graduating high school seniors would require roughly doubling the number of students

progressing through the system. The challenge is more than increasing the scale of the existing system.

Without reforms (including new design models), increasing the number of high school students graduating and attending college would likely decrease the graduation rates of colleges. National Service Universities will address this issue by taking responsibility for the success of each student and dramatically reconfiguring the delivery of content through adaptive learning and other technology-enabled strategies. It is anticipated that many National Service Universities will likely scale to include twice as many students as are currently enrolled, producing three to five times as many graduates, and serving more than ten times the number of engaged learners. We would need perhaps many large-scale public research universities to commit to these sorts of scale objectives in order to make meaningful gains on our national higher education attainment goals. Achieving these outcomes requires broad-based commitments to excellence and public service and necessarily requires sociological and technological interventions. Conceptualized as such, specification of these outcome-oriented objectives serves to highlight the process whereby universities set out to become National Service Universities.



# Examples of Postsecondary Educational Attainment Goals by Select States

Arizona	60% by 2030	Massachusetts	60% by 2030
Colorado	66% by 2025	Minnesota	66% by 2025
Connecticut	70% by 2025	Missouri	70% by 2025
Georgia	60% by 2020	Montana	60% by 2020
Idaho	60% by 2020	Oregon	60% by 2020
Illinois	60% by 2025	Tennessee	60% by 2025
Indiana	60% by 2025	Texas	60% by 2025
Kansas	60% by 2020	Utah	60% by 2020
Louisiana	60% by 2025	Virginia	60% by 2025
Maryland	60% by 2025	Washington	60% by 2025

Source: Arizona Board of Regents

## A Case Study of a National Service University in Genesis: Arizona State University

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National Service Universities will comprise various differentiated institutional models. For example, Purdue University is Indiana's public land-grant research university. Established as a Second Wave university that eventually transitioned into a Fourth Wave research university, Purdue's research excellence, public service mission, and commitment to student access have expanded under its new innovative acquisition of Kaplan University, a former for-profit, primarily online university. Through this technology-enabled strategy, Purdue will consolidate its position as a leading land-grant National Service University. Similarly, Arizona State University, which was established as a Second Wave regional teachers' college, transitioned into the Fourth Wave in the final decades of the twentieth century. In 2002, ASU resolved to establish itself as the foundational prototype for the New American University, which represents a new model for major public research universities, with the potential to scale to offer broad accessibility to academic platforms of world-class knowledge production focused on societal outcomes. With this foundation, ASU is positioned to be a leading National Service University. ASU's transformation is the focus of the rest of this document.

The reconceptualization of ASU and its movement toward a National Service University has demonstrated that research excellence and broad accessibility are not necessarily mutually exclusive. ASU has succeeded in advancing both the academic rigor and diversity of its student body, which

increasingly includes more and more students from socioeconomically disadvantaged and underrepresented backgrounds, including a significant constituent of first-generation college applicants. The university is committed to offering admission to all academically qualified students regardless of financial need while maintaining the admissions standards of the great Fourth Wave research universities at midcentury.<sup>1</sup>

In its research enterprise, ASU is determined to be of ever-greater service to the nation and the world, advancing innovation on all fronts with research that imparts broadly egalitarian benefits across the entirety of society. Its most prominent research initiatives are in alignment with critical national goals in such strategic areas as earth and space exploration, sustainability and renewable energy, advanced materials, flexible electronics, healthcare, national security, urban systems design, and STEM education.

Through research-based learning and new approaches to pedagogy, students become adaptive master learners across a range of transdisciplinary fields, prepared for the continuously changing, highly adaptive workforce of the future knowledge-based economy. Moreover, through strategic organizational streamlining designed to cut costs while preserving the quality of the academic core, ASU has become one of the nation's most efficient producers of both college graduates and high impact, socially meaningful research.

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As a consequence of the new model, significant enrollment growth has been accompanied by unprecedented increases in freshman persistence, graduation rates, degree production, learning outcomes, minority enrollment, academic success, and all measures of quality of graduates. Corollary achievements include growth in research infrastructure and sponsored expenditures, which since 2004 have made ASU the fastest growing research university in the United States; world-class academic accomplishment for scholars and students; and the transdisciplinary reconfiguration of academic organization around broad societal challenges rather than historically entrenched disciplines.<sup>2</sup> **As an emergent National Service University, ASU represents an example of the next stage in the evolution of research learning conducted in the context of cutting-edge knowledge production.**

Beginning in 2002, ASU embarked on a comprehensive redesign process, advancing an institution initially formed during the late stages of the Second Wave, which had by then transitioned to the early stages of the Fourth Wave. Guided by a new charter that recognizes the imperative for broad accessibility to academic excellence as well as teaching and research focused on social and economic outcomes, ASU has succeeded in transforming itself into a prototype early-stage National Service University. ASU's design aspirations represent ideals for institutional culture as well as strategic approaches to the accomplishment of goals and objectives, including social embeddedness through mutually beneficial partnerships; academic enterprise and innovation; and a focus on place through the embrace of an institution's cultural, socioeconomic, and physical setting.

## Design Elements of a National Service University

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- **Scale.** Operates with a commitment to maximizing the scale of public benefit.
- **Technology.** Integrates technology into the operational core of the university.
- **Social Impact.** Advances teaching and research with direct social impact.
- **Knowledge driven.** Commits to the highest quality production of usable knowledge.

# ASU Charter

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ASU is a comprehensive **public research** university, measured not by whom it excludes, but by **whom it includes** and how they **succeed**; advancing **research and discovery** of public value; and assuming **fundamental responsibility** for the economic, social, cultural and overall health of the **communities** it serves.

## The Specific Pathways to Becoming a National Service University

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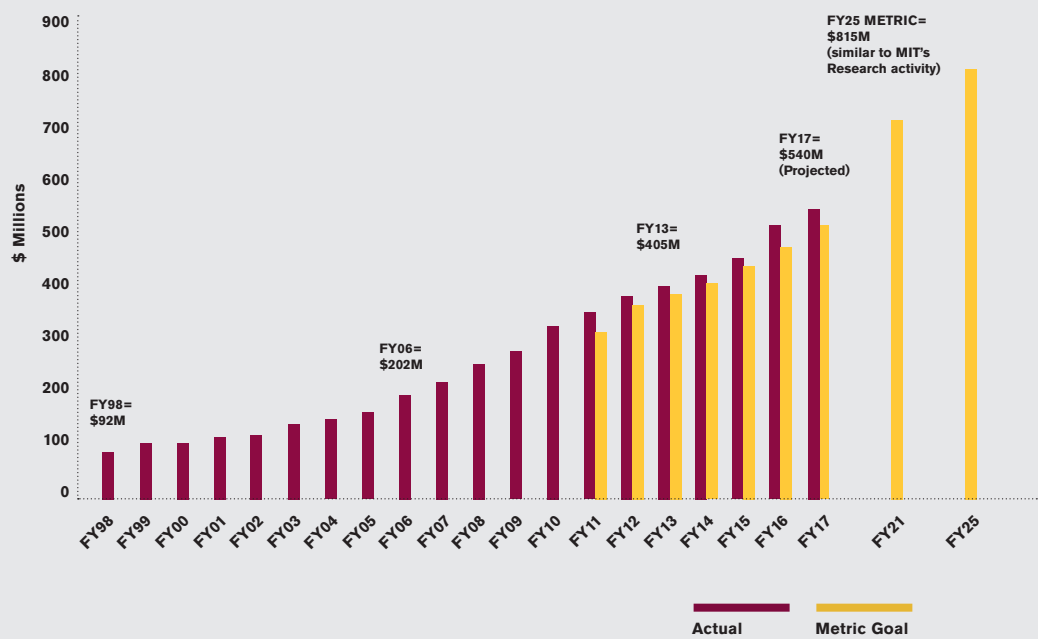
If the objective of ASU's reconceptualization had merely been incremental improvement and replication of historical models, ASU could have followed the path from Point A, representing its status prior to the reconceptualization, to Point B, representing a highly successful conventional Fourth Wave research university. The framework for such an institution would have included the continued dominance of conventional disciplinary silos; the formation of a medical school; and the culling of the student body through the selection of ever more "elite" freshmen classes, leading to the elimination of the often disadvantaged bottom quarter of the undergraduate student body and a reduction in the number of students admitted with Pell Grants.

The conventional approach would have sought to transform ASU into another very large and successful "flagship" public research university such as the University of Michigan, University of California, Los Angeles (UCLA), or the University of Texas at Austin. This Fourth Wave model has been highly successful and will continue to succeed, as each of the previous waves have demonstrated in their own right. But the academic community at ASU aspired to move beyond Point B — the Fourth Wave research university — to Point C, which represents the operationalization of an

academic platform characterized by differentiated, transdisciplinary academic units and new approaches to teaching, learning, and research at scale, with scale correlated with enrollment demand, socioeconomic diversity, and societal impact. The Fifth Wave thus embraces meaningful scale and scope as assets, and leverages technology to realize an expansive social footprint while simultaneously increasing performance and quality.

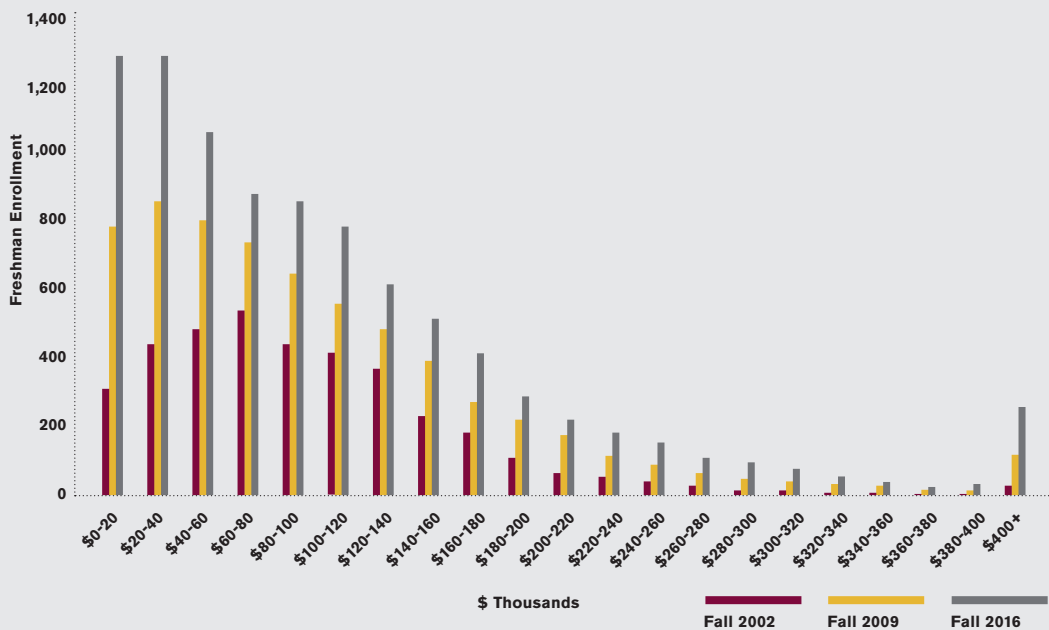
ASU is a large-scale, sociotechnologically integrated, research-intensive institution that, through scale, scope, and differentiation, has achieved the potential to dramatically impact Arizona. By 2025 ASU will be producing 60 percent of the high-demand public university degrees in Arizona, including science, engineering, and nursing; conducting more than \$815 million per year in funded research; and awarding more than 32,000 degrees per year. As of 2016, ASU has already become one of the top ten institutions in the country for research expenditures among institutions without a medical school.<sup>3</sup> Technology facilitates ASU's expansion into new teaching and learning realms, even as it allows differentiation of core learning methods and the advancement of successful student learning outcomes across a very broad student demographic.

# Research Expenditures Have Doubled Every Six to Eight Years

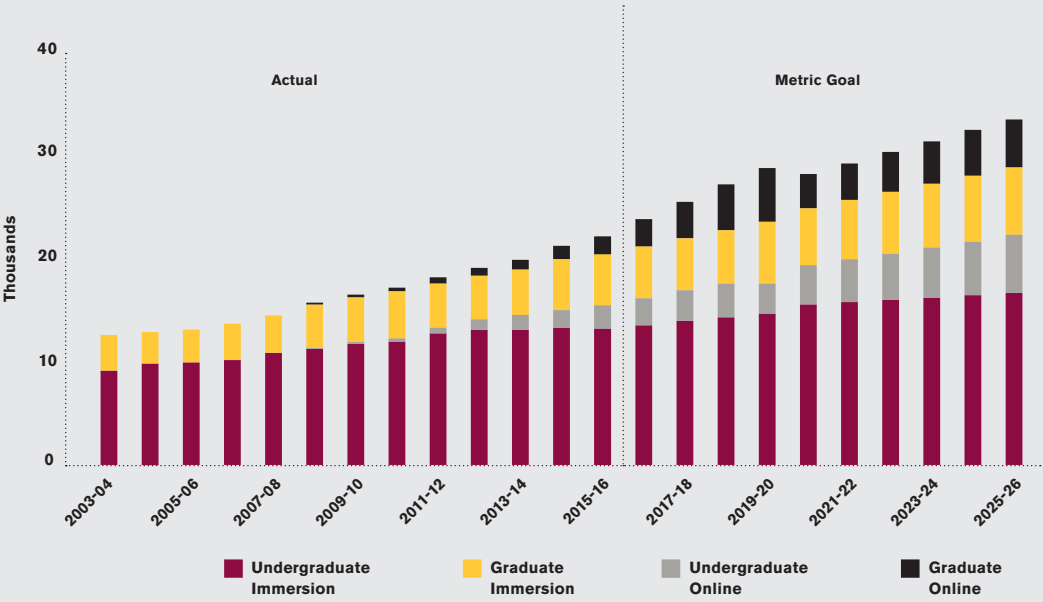


Source: Arizona State University and NSF Higher Education Research and Development Survey

## ASU First-Time Full-Time Freshmen Enrollment by Adjusted Family Income



# Undergraduate and Graduate Degrees Awarded





## Next Steps Toward a System of National Service Universities

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In the twenty-first century, five forces are reshaping American higher education. Economic and social disruption is continuing to accelerate, which is placing many institutions of every scale at risk. The global knowledge economy is leading to the globalization of higher education, which is intensifying competition as well as cooperation. New business and delivery models are gaining traction. Greater transparency and accountability about student outcomes is becoming the norm. And student and family demands are rising for greater return on investment in higher education.

Institutions of higher education have evolved to address societal challenges over two millennia, and the distinctive attributes of emerging National Service Universities offer new possibilities to rethink our approaches to present challenges. What if the objective became to establish competency among students in a collective knowledge base prior to subsequent differentiation and individuation? What if the socioeconomic status of incoming students no longer predicted outcomes in educational

attainment? What if all students were literate in science and technology as well as the humanities? What if two to three majors were common, and through reduced costs colleges and universities produced three times the output? If new approaches to teaching and learning could accomplish some or all of these outcomes, National Service Universities will have taken a significant step toward societal transformation at scale.

If our nation is to prosper in the twenty-first century, a subset of public universities, either on their own or in networks, must take up the challenge to evolve in scope and at social scale to promote accessibility to a broad demographic representative of the socioeconomic and intellectual diversity of our nation. The set of institutions of the Fifth Wave could be said to collectively constitute the national university envisioned by the founders of our nation — a set of institutions committed to service to the nation that may more accurately be characterized as national service universities.

## Next Steps

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- **Validation.** Thought leaders and practitioners need to engage these ideas and communicate the concept to a variety of audiences.
- **Policy evolution.** Policy changes that have the potential to advance these ideas need to be identified, studied and pursued.
- **Incentivization.** Institutional changes need to take place that allow government, business and philanthropy to provide special rewards for these universities.
- **Activation.** New models and opportunities for implementation at new universities need to be advanced.

## Notes

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1. During the 1950s and 1960s, for example, the University of California, Berkeley, admitted California resident high school graduates who had completed a set of ten required courses and attained a cumulative B (3.0) grade point average.
2. For a case study of the reconceptualization of Arizona State University, see Michael M. Crow and William B. Dabars, *Designing the New American University* (Baltimore: Johns Hopkins University Press, 2015), chapter 7.
3. In terms of total research expenditures for institutions without a medical school, the top ten leading schools are as follows: 1) Massachusetts Institute of Technology; 2) University of Texas M. D. Anderson Cancer Center; 3) University of California, Berkeley; 4) Georgia Institute of Technology; 5) University of Illinois at Urbana-Champaign; 6) Purdue University, West Lafayette; 7) University of Maryland, College Park; 8) Virginia Polytechnic Institute and State University; 9) North Carolina State University; 10) Arizona State University (NSF 2015 HERD Survey).





**Office of the President**

PO Box 877705

Tempe, AZ 85287-7705

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