INTRODUCTION
In spring of 2011, the Arizona Board of Regents approved the following initiatives under Northern Arizona University’s FY12-FY16 TRIF Business Plan.

WATER, ENERGY, AND ENVIRONMENTAL SOLUTIONS (WEES)
Northern Arizona University’s WEES initiative comprises two programs: Solutions for Arizona’s Rural Landscapes encourages and supports rigorous scientific research and sound scientific and technical support to minimize catastrophic wildfire risks, rebuild a forest products economy, promote collaborative conservation planning and analysis using landscape-scale spatial data, and to convene rural and tribal community stakeholders to explore economic alternatives such as renewable energy development. Climate and Energy Solutions explores and evaluates energy development and environmental context in Arizona. Northern Arizona’s University’s strength in environmental science and policy, climate science and wind energy, and the collaboration between stakeholders, communities, and tribes serves as the foundation for increasingly visible and ambitious programs that contribute to building Arizona’s economic future.

IMPROVING HEALTH
The overall goal of NAU’s Improving Health initiative is to strengthen and grow Arizona’s biosciences economy through significant investments in research infrastructure, technology transfer capacity, and applied research projects designed to result in tangible intellectual property that can be commercialized through licensing and the formation of university spin-offs. Investments in FY13 included individual research projects and investments in campus-wide research capacity in the form of new postdoctoral associates, shared research equipment and establishment of a rapid prototyping laboratory.

ACCESS AND WORKFORCE DEVELOPMENT (AWD)
Northern Arizona University’s AWD initiative addresses the need of Arizona employers, as well as their current and future employees, to support the state’s economic growth. NAU addresses this need through the development and delivery of courses and degree programs to support workforce development in program areas such as health, teacher education, and business and nonprofit managers; and the use of technologies to increase student achievement, accelerate student progress through degree completion and enhance efficiency across university courses and programs.
WATER, ENERGY & ENVIRONMENTAL SOLUTIONS (WEES)

Arizona’s TRIF investment in Northern Arizona University under the WEES initiative funds a number of projects designed to identify and catalyze economic opportunities for Arizonans that sustain environmental and social values. In FY13, NAU leveraged its historical strengths in environmental science and policy, climate science and wind energy while introducing new visible and ambitious projects that contributed to building Arizona’s sustainable future.

Goals

- **New Initiatives in FY13: REAP and SPA Programs.** Catalyze the advancement of research and research training capacities through the acquisition of new talent and state-of-the-art research equipment. In FY13, NAU faculty recruited 13 post-doctoral scholars from top-tier research universities for two-year fellowships at NAU through the **Support for Post-doctoral Associates (SPA) Program.** These scholars bring to NAU new technical capacities and expertise that did not currently exist at NAU and are expected to stimulate new research ideas, collaborations, entrepreneurship and innovation with the potential to deliver increased extramural funding, intellectual property and student research training opportunities. In addition, through the **Research Equipment Acquisition Program (REAP),** teams of NAU researchers collaborated to acquire state-of-the-art research equipment that extends NAU’s current research and research training capacities in both laboratory and field investigations, and that will make NAU investigators more competitive for extramural funding.

- **Ecological Restoration Institute.** Provide leadership in the development of solutions to the costly environmental problem of degraded forest health, water quality and availability and alternative energy fuel in the form of biomass and biodiesel. Contribute to workforce development by providing quality undergraduate and graduate funding, fieldwork, and education in forest restoration.

- **Landscape Conservation Initiative.** Through the establishment of this new institute, engage students, decision makers, and the public in meaningful dialog, grounded in robust science, to help forge solutions to landscape conservation and sustainable community development.

- **Institute for Sustainable Energy Solutions.** Establish a new institute to build the research base at NAU through increased opportunities for proposal submissions and acceptance with external partners. The strategic participation in regional and national meetings will develop collaborations with researchers at other Arizona universities and prominent research universities nationwide.

- **Merriam-Powell Center for Environmental Research.** Expand and market the availability of field stations, experimental arrays, and facilities for geospatial analysis and biodiversity studies. Such expanded capability and visibility will be aimed both at increased leveraging of grant funding and at a transition toward self-sustaining status for the field stations and facilities.
Summary of Accomplishments

In FY13, NAU invested TRIF-WEES funds in projects and activities whose outcomes were intended to stimulate the state’s economy through research innovation, partnerships in sustainable solutions research, research training and technical assistance.

Outcomes

- Recruited six post-doctoral scholars (from top-tier research institutions) with expertise in Paleoclimatology, ecohydrology, wind and solar energy, environmental sciences and acoustics.
- Start-up consultancy Conservation Science Partners, Inc. (CSP) (a spin-off of NAU’s Landscape Conservation Initiative) increased staff from two to seven and expanded its presence into California and Colorado.
- Produced a full-length documentary, “A Thousand Invisible Cords: Connecting Genes to Ecosystems”, showcasing the 20-year body of work of Regents’ Professor Tom Whitham of NAU’s Merriam Powell Center for Environmental Research (MPCER). This documentary has been screened by over 150 PBS stations, has been publically shown in France, Australia and Chile, and has won a number of film-making awards.

- Established a number of international collaborations to expand the Southwest Experimental Garden Array (funded through a $2.5 million NSF Major Research Instrumentation Award received in October, 2012) into a Global project.
- Merriam Powell’s Colorado Plateau Museum of Arthropod Biodiversity and nine collaborating arthropod collections received a three-year, $2.1 million grant from the NSF to create a virtual information network on ground-dwelling arthropods.
- Ecological Restoration Institute produced two key reports associated with the 2010 Schultz Fire: “Efficacy of Hazardous Fuel Treatments” and “Full Cost Accounting of the Schulz Fire” (the latter produced in conjunction with NAU’s W.A. Franke College of Business and the Rural Policy Institute). Media generated by the release of these reports was significant, involving 426 news outlets.
IMPROVING HEALTH: Investing in Biotechnology and Bioengineering

The mission of the I-Health initiative is to strengthen the university as an innovator and facilitator, translating biotechnology and bioengineering into economic activity. In FY13, NAU built upon existing regional and state-wide economic development partnerships to strengthen its ability to commercialize university innovations through licensing and the formation of spin-offs, and continued to encourage and support applied research designed to solve real-world problems and generate intellectual property.

Goals

- **Build Capacity in Technology Transfer.** Up until FY12, Northern Arizona University’s technology transfer activities were largely conducted by a combination of outside organizations and consultants (e.g., such as through the Northern Arizona Center for Entrepreneurship and Technology) supported by in-house staff. However, in order to maximize the potential economic benefit of the outcomes of NAU research through commercialization, NAU set out in FY12 to strengthen internal capacity so that technology transfer at NAU is managed by a professional in-house staff which utilizes outside entities such as NACET and NAU Ventures (a subsidiary of the NAU Foundation) for supporting activities. These efforts are expected to be ongoing throughout the FY12-FY16 Business Plan period.

- **Catalyze development of intellectual property (IP).** Provide project-based financial support to faculty whose research has the potential to generate outcomes suitable for commercialization through licensing to established companies and/or the formation of spin-offs; build and strengthen relationships with state-wide partners to facilitate the acquisition of funding and technical assistance necessary to grow successful spin-offs.

- **Build institutional capacity to expand bioscience research.** Establish and implement competitive internal grant programs, such as the REAP and SPA programs (see WEES Goals) designed to make targeted investments in bioscience-related research infrastructure that will result in the growth of the research enterprise and allow NAU researchers to compete more successfully for external funds.

- **Establish a state-of-the-art, rapid prototyping facility.** As NAU has placed a greater emphasis on generating tangible intellectual property, researchers across campus demonstrated the need for a facility that would provide design and manufacturing expertise and equipment and assist in the reduction to practice of innovations coming out of NAU.

- **Invest in the Center for Microbial Genetics and Genomics.** Investments aimed at enhancing synergies between Northern Arizona University and the Translational Genomics Research (TGen) Institute through the support of individuals jointly appointed.
Summary of Accomplishments

In FY13, NAU invested TRIF I-Health dollars to encourage interdisciplinary research and innovation in biosciences and biotechnology strategically designed to strengthen and expand NAU’s contributions to Arizona’s bioscience economy.

Outcomes

• Submitted one provisional and three non-provisional patent applications for intellectual property developed exclusively through research supported by the TRIF I-Health initiative
• Recruited six post-doctoral scholars (from top-tier research institutions) with expertise in bioinformatics, molecular/cellular biology, biomechanics and neuroengineering, and microbial genomics.
• Received TechConnect 2013 National Innovation Award for the iTester™, a hand-held multiple assay reader developed largely with TRIF funds by NAU researchers.
• Provided over 1,000 hours of services to NAU faculty through the NAU RAPIDLab (Realization of Advanced Products and Innovative Design) facility for the design and development of prototypes, research tools and components. Establishment of this lab has resulted in the initiation of discussions with PADT, Inc. regarding a partnership to provide services for their clients in Northern Arizona.
• Center for Microbial Genetics and Genomics (MGGen) Director Paul Keim received the 2012 Bioscience Researcher of the Year Award from the Arizona Bioindustry Association!
• Received a $600,000 Partnerships for Innovation grant from the National Science Foundation for the project, “Emulating Biological Actuation”, which has catalyzed the commercialization of intellectual property developed (in part) with TRIF funding.

The iTester™ device is designed to accept a cassette cartridge of up to seven individual lateral flow assays, and it quantifies the assay, displays the assay results, and archives/exports the data to a database server.

Paul Keim- Regents' Professor of Biology and Cowden Endowed Chair in Microbiology in his lab on NAU’s Flagstaff Campus
ACCESS/WORKFORCE DEVELOPMENT

One of Northern Arizona University’s (NAU) strengths is access and workforce development. For over 30 years, NAU has served rural and urban communities throughout Arizona, providing opportunities for place- or time-bound citizens to continue their educational progress. Three-quarters of NAU’s Extended Campuses students work at least 32 hours per week.

This initiative focuses on shortages of teachers, health-care professionals, trained managers and information technology professionals. The goal is to make quality programs available in locations and through delivery methods that suit student need. Thirty-six rural and urban sites offer face-to-face contact, a wide variety of on-line and hybrid programs, and flexible scheduling, all of which support students to learn while balancing work and other commitments. Courses can be completed in as little as seven weeks and numerous programs allow students to transfer as many as 90 credit hours from an Arizona community college, leaving only 30 NAU units needed to complete a bachelor’s degree. These transfer friendly programs are among the most affordable four year degree options in the state of Arizona. Students can also receive admission, enrollment, payment, and other services in-person and through the Extended Campuses Service Center, which is available by toll-free phone, email, and online chat.

Partnerships with Arizona community colleges continue to thrive. The 2NAU joint admission program continues to attract students as it is structured to provide access to a four-year degree through seamless transition from the community college to NAU. Students are jointly admitted to their community college and NAU so their coursework at each institution is tailored to ensure their goals are met in the most affordable and efficient way. The program’s more than 3,400 participants in 2013 reflect the statewide demand for this innovative pathway (including participants from the Maricopa Community College District, Cochise Community College, Pima Community College, Central Arizona Community College, Eastern Arizona Community College, Mohave Community College, Yavapai College, Arizona Western College, and Coconino Community College).

Extended Campuses conducted a thorough review of the enrollment process during the 2012/13 academic year. With a focus on removing obstacles to enrollment and identifying opportunities to improve the service and information provided to students, this evaluation resulted in significant staff reorganization and improved business processes. As most of the students pursuing AWD programs are adults who work and have other commitments, streamlining the processes surrounding enrolling in classes is essential to their success. This effort will continue through the upcoming year and reflects NAU’s ongoing commitment to offer programs that best serve the needs of the state.
Established in 2001, the e-Learning initiative has been improving student learning and supporting successful degree completion through engaging, effective and efficient use of technology. Over the past year the eLearning Center (ELC) completed the majority of course migrations from Blackboard (Bb) Vista to Bb Learn Learning Management System (LMS). As these two LMS’s were initially significantly different, and as Bb Learn continues to change, a triage process was developed to repair and update courses as needed. In addition, a template has been developed and is being piloted by several departments for use in maintaining consistency in the look and feel of NAU web courses and simplifying and enhancing the student experience.

Continued efforts to support student success include providing training courses for faculty that focus on basic technology skills and on teaching with and through technology. The teaching course is technology agnostic with a focus on pedagogy and technique for engaging students in online and blended courses.

The eLearning Center provided on-going support for faculty through technology based activities that included implementing a new classroom response system (iclickers) and migrating to a new Web Conference server system. Both of these activities required rewriting support materials and providing training and support for faculty as well as migrating and updating course materials.

The ELC Faculty Helpline also provides dedicated support Monday – Friday, 7am – 6pm via telephone, and 24/7 via email. Assistance is provided by ELC staff and student employees, support staff from across NAU (ITS, CASA, Extended Campuses, Cline Library, etc.), and occasional vendor support (e.g., Blackboard, e-Instruction, etc.). The Helpline supports over 12,600 requests on an annual basis. ELC also provides faculty with training on Bb Learn and other web & technology tools. The majority of the training offered has been related to Bb Learn’s Learning Management System (LMS). The table below details the number of attendees of Bb Learn trainings by college and workshop title.

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<th>Workshop Title</th>
<th>Engineering, Forestry, &amp; Natural Sciences</th>
<th>Social &amp; Behavior Sciences</th>
<th>Health &amp; Human Services</th>
<th>WA Franke College of Business</th>
<th>Arts and Letters</th>
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