

FALCON Poster Presentations
Saturday, November 7, 2015
3:15–5:00 pm
Augusta

Student Section

1	Title	Presenters	Institution/Organization
	<i>Gete okosomin: Journey of a “Cool Old Squash”</i>	Susan Menzel	Lac Courte Oreilles Ojibwe Community College

ABSTRACT

In 2009, during an archeological dig on the Menomonee Reservation near Green Bay, Wisconsin, a clay ball was unearthed containing seeds which were carbon-dated at 850+ years of age. The seed was given to a member of the Menomonee tribe who passed it on to Winona LaDuke of the White Earth Land Recovery Project and this seed began an awesome journey of rebirth, especially among the First Nations of Wisconsin and Minnesota.

In 2013, descendants of that ancient squash seed, named Gete okosomin, (“cool old squash”) by Winona LaDuke, arrived at Lac Courte Oreilles Ojibwa Community College Sustainable Agriculture Research Station (referred to as LSARS here). The ancient seeds were planted in 2012 resulting in large, beautiful squash that was vigorous on the vine and delicious.

My study follows the planting and cultivation of the F3 generation from the ancient clay ball and subsequent generations of squash to the present day, F5, including 26 thriving plants presently growing at LSARS. Not knowing what to expect and having no references outside of a presentation done by Ms. LaDuke at a native food sovereignty conference in 2012 and sharing anecdotes and information with other recipients of Gete okosomin seeds, this continued study leads me to some interesting and yet important knowledge about this squash and it’s possible impacts on the food systems of First Nations’ communities.

My poster illustrates the journey of Gete okosomin from that clay ball found on Menomonee land until the present day at LSARS and beyond. Because these viable seeds have been an important find of our modern age, we can only conjecture at this time why it has returned to us after an 850+ year sleep. It is also an opportunity to learn about a vegetable which only a few modern people have had any experience with.

2	Title	Presenters	Institution/Organization
	West Nile Virus Surveillance – Fort Belknap, Montana (2015)	Peggy Castillo	Aaniiih Nakoda College

ABSTRACT

West Nile Virus (WNV) is an arthropod-borne virus (arbovirus), which is mainly spread by infected mosquitoes. WNV was first detected in North America in 1999, but did not exist in Montana (MT) until 2002. This disease is a condition that involves our entire nation, along with other countries. All cases are to be reported to the Centers for Disease Control and Prevention (CDC), primarily by state and local health departments. The discovery of WNV in the United States, caused Montana to collect samples and test for WNV.

The Aaniiih Nakoda College (ANC), a tribal college in MT, started a WNV program in 2000 consisting of student interns and faculty members. Soon after, a collaborative relationship was developed between ANC, Montana State University and Carroll College to continue this WNV research/surveillance.

This project’s objectives are; to trap and collect mosquitoes, sort through the species, complete DNA extractions and analyze using real time PCR. Trappings are performed once a week and are set during the evening and collected the following morning. Mosquitoes are then placed in a freezer, for preservation. This helps to solidify mosquitoes and keep the possible virus intact. Once frozen, the mosquitoes are sorted through. There is a specific species that is known to carry WNV, called *Culex tarsalis*. Student interns are taught how to identify the different species of mosquitoes. For the *Culex tarsalis* species, there are certain characteristics that we use to identify.

The typical season for when mosquitoes are most active is usually June through September. Anyone living in an area where WNV is present is at risk for infection. This program runs tests for WNV present on the reservation. Awareness is an important key to prevention.

3	Title	Presenters	Institution/Organization
	Potential Changes in Denitrification of Wetlands dominated by Invasive <i>Typha x glauca</i>	LeAnn Charwood	Leech Lake Tribal College

ABSTRACT

Eutrophication of surface waters due to excessive amounts of nitrates discharged into aquatic ecosystems pose a serious threat to drinking water supplies, including the loss of habitat that sustains the biodiversity of hydrophytes, invertebrates, fish, and wildlife of southern Minnesota’s agricultural watershed. The prairie/grassland of the Upper Mississippi and Minnesota River Basin has been mainly converted to agricultural row crops and feedlots for livestock this phenomenon has subsequently degraded water quality, altered ecosystem dynamics, and contributed to the expanding hypoxic dead zone of the Northern Gulf of Mexico.

The degradation of aquatic ecosystems may potentially reduce the diversity of wetland biota, microbial composition; alter nutrient cycles, including the stability and sustainability of aquatic food webs. Restoration of wetlands and habitat rehabilitation is vital to the conservation

and protection of natural resources and the overall health of ecosystems. Aquatic and terrestrial invasive species are becoming increasingly common throughout much of the state. Wetlands and surface waters are especially susceptible to invasions of exotic aquatic species.

4	Title	Presenters	Institution/Organization
	Effects of a Culturally-Relevant Educational Intervention on College Retention and Self-Efficacy for Healthy Choices among American Indian College Students.	Jill Keith	North Dakota State University

ABSTRACT

Background: American Indians/Alaska Natives (AI/AN) have the lowest rates of college retention and graduation in the U.S. Additionally, AI/AN face health disparities including higher rates of obesity/overweight and Type 2 diabetes.

Purpose: The study purpose was to explore the effects of a culturally relevant life skills curriculum delivered in a family-style environment on self-efficacy, healthy choices, and college retention in tribal college students.

Methods: A non-experimental cohort design using mixed methods (quantitative and qualitative) was utilized for the study. Participants in the study were purposively sampled newly enrolled, academically under-prepared tribal college students. Participant demographics included various tribal affiliations, ages, and number of dependents. The curriculum was built on family and consumer science education and adapted for cultural relevancy. Research instruments included pre- and post-questionnaires and pre- and post-telephone interviews.

Results: General self-efficacy did not increase significantly, nutrition knowledge increased but not significantly, and nutrition attitudes and beliefs were not different between pre- and post-intervention. Dietary analysis reflected improved intake, however none of the participants met dietary recommendations for any food group. Eating behaviors such as eating in front of the TV decreased. Retention of students within-semester was lower than overall retention at the tribal college. However, semester to semester retention of completers was 100%. Qualitative analysis revealed a variety of themes and subthemes related to food and healthy choices.

Implications/Future Practice: Addressing self-efficacy and perception of capabilities regarding making healthy food choices can help AI/AN students feel more capable of success and impact the quality of their diet. Qualitative efforts to build understanding of barriers and strategies for making healthy food choices can assist in education and programming efforts aimed at improving dietary intake. Future research and programming should continue to address the challenges that remain to college retention and improving dietary intake to meet recommendations.

5	Title	Presenters	Institution/Organization
	Assessment of Potential impacts on Water resources posed by Hydraulic Fracturing in San Juan, New Mexico	Jayvion S Chee and Teverrick V Chee	Navajo Technical University

ABSTRACT

The state of New Mexico is one of the major extractors or producer of Crude oil and natural gas production ranking 6th and 7th in the state respectively. Most of the oil and gas production happens in two counties which make 80-143 million annually; Lea and San Juan county. Including the rest the state, there are approximately 110,000 wells in New Mexico and about 90% of those well employ a technique called hydraulic fracturing an effective but highly controversial mining technique. Hydraulic Fracturing is a technique that uses thousands of gallons of water to fracture the bed rock to allow the oil or natural gas to flow upwards. This technique is essential for mining especially in this region, although the process involves shooting the water down mixed with sand and cocktail of chemical many if not all are dangerous. Due to a loophole in environmental laws companies are not required to clean or recycle/reuse the water. This along with improper storage and treatment has led to many incidents of spillages resulting in severe water contamination. This has become a severe concern especially in the San Juan area where fracking has recently be sourced closer to agricultural areas that depend heavily on ground water. This project had been drawn up as a resource for residents of those areas to address concerns and misconceptions about hydraulic fracturing and address the concerns behind the process. The project was a collaboration of myself (Teverrick Chee) and Jayvion Chee with the resources of New ESPCoR and our home university Navajo Technical University.

6	Title	Presenters	Institution/Organization
	Molecular Evidence for the Consumption of Plutel/a xylostella, Diamondback Moth within Bat Guano	Nikki Olson	United Tribes Technical College

ABSTRACT

North Dakota is the nation's leading canola (*Brassica napus*) producer, generating approximately 90% of America's canola crop. Canola produces pods full of seeds that are crushed and made into canola oil (among various other uses). This oil has the least amount of saturated fats of all the culinary oils and is economically important to North Dakota. Among canola pests, *Plutella xylostella* (Diamondback Moth) is an infectious moth that can devastate every part of the plant from its leaves to the seed pods. *P. xylostella* is known for its resistance to pyrethroid insecticides, main insecticide used for canola, thus there is no known commercially-approved defense against the moth. There is, however, a natural pesticide in the region. North Dakota is home to eleven different bat species, all of which are insectivores and eat up to half their body weight nightly in mosquitos, moths, and beetles. Bats also play an economic role in agricultural as pollinators, pesticide agents, and their rich guano has fertilizing capabilities. The purpose of this study is to use molecular techniques to determine if bats are feeding on *P. xylostella* and other moth species and to develop an estimate of the economic value bats bring to North Dakota agriculture. Guano was collected throughout North Dakota during the months of

June and July by trapping bats using mist-netting techniques. Bats were held in cloth bags for 1hr or until a sample was obtained. Guano samples were processed using a Zimo Research Fecal DNA MicroPrep kit and analyzed using BLAST software. DNA analysis provided a list of moth species present in bat guano from selected sites in the region.

7	Title	Presenters	Institution/Organization
	An Ethogram of Big Brown Bats (<i>Eptesicus fuscus</i>): General Behaviors and Social interactions in an Artificial Roost	JP Holmes	United Tribes Technical College

ABSTRACT

The big brown bat (*Eptesicus fuscus*) is a species common to the continental United States and portions of Canada. Due to a wide spread distribution, moderate abundance, and tolerance to captive life, big brown bats commonly serve as a model study species for Microchiropterans. Despite the vast number of studies on big brown bats, little is known about their diurnal roosting behaviors. Detailed ethograms are not available for this species, making behavioral studies difficult. An ethogram is necessary to facilitate more intensive investigations of this species ecology. The purpose of the study was to create an ethogram for big brown bats using behaviors displayed while in an artificial, captive roost. Big brown bat males were captured throughout North Dakota and transported to an artificial roost at the Red River Zoo, Fargo N.D. Bats were tagged for identification and placed in the enclosure for monitoring. Video cameras were mounted on the roost and recorded approximately 12 hrs. of footage daily. Videos were analyzed using JWatcher software, which logs and timestamps specific events and behaviors exhibited by the bats. Morning and evening states/events were compared using a Student's t-test. Videos of female big brown bats were obtained from a previous study at North Dakota State University and we analyzed to compare male and female behaviors using a Student's t-test.

8	Title	Presenters	Institution/Organization
	Traditional Native American Recipes	Gavin Rafelito, Kyle Aragon, and Rebecca Lee	Southwestern Indian Polytechnic Institute

ABSTRACT

Traditional Native American Recipes is an educational project of the culinary arts students at Southwestern Indian Polytechnic Institute, Albuquerque, New Mexico. The intention of the assignment is to inspire Native American students to delve into culinary coursework, by validating their own ethnic cuisines. It is also intended to preserve traditional Native American recipes.

The SIPI Culinary Arts Program and Native Skills USA Culinary Arts Club is dedicated to the preservation of culture, nutrition and welfare of aboriginal communities. The intention of this initiative is to both educate students and document their cultural cuisine and history. This is the first volume in a journey of cultural perspectives with the purpose of creating sustainable food pathways.

This is a living project of preserving Native culture through cuisine. The students are

documenting traditional recipes by talking with their ancestors. This project will continue on over the next several years. The students are connecting to their cultural legacy through their Native food pathways. When completed, each volume will be linked to the SIPI website.

9	Title	Presenters	Institution/Organization
	To diversify forage crops on the Navajo Nation to improve soils and hay security for farmers while establishing new agribusiness opportunities among tribal members	Randell Shorty	Dine' College

ABSTRACT

The goal of the research project is to empower local farmers with knowledge of forage crop substitutions and encourage grass diversity throughout the Navajo Nation. Under Dine College's Land Grant Office, staff members have developed workshops and collected field data all while involving community members, local farmers, student interns, and university associates.

The research plots are located in Tsaile, Lower Wheatfields, Teec Nos Pos, and Many Farms, Arizona. Twelve grass species were planted at the sites which include warm and cool season crops. Soil samples, rainfall measurements, and harvest data were recorded, as well as the plant establishment information and irrigation application. Furthermore, promotion of plant products will help broaden income to farmers and ranchers.

The results for the final year of the research reveal progress, compared to the previous years. The seeding rate was doubled for each crop, the soil received amendments, and the irrigation method was revised as well. For each site, grass sprouted within weeks. However, prairie dogs destroyed most of the vegetation and weeds began to overtake the plots. Upper Wheatfields was removed from the list due to dense native plant growth. Rows with soil modifications had better seedling emergence than the original soils.

From the environmental perspective, these crops will improve soil stability and nutrient resource. The weather tolerance of the drought resistant crops will alleviate the need for water. From the business standpoint, the data indicates these alternative crops can be produced on the Navajo Nation. Cool season crops will prolong harvest periods and ensure demand from the consumers.

10	Title	Presenters	Institution/Organization
	Ecological Data Collection	Anthony Sanapaw	College of Menominee Nation

ABSTRACT

This experiential learning was based on the long-term forest monitoring plots installed through the TCRGP- NIFA grant titled ""Measuring the Pulse of the Forest"", which concluded at the end of August 2015. The goal of the ecological data collection internship is to gain a first-hand understanding of how field-based data is collected, sorted, filtered, and stored in both hard-copy and digital formats. To do this, a variety of tools and methods are learned and applied including tree and plant identification, forest site characteristics, common forest (tree)

measurement tools, and both manual and digital spatial tools for mapping and orientation. The purpose for these activities is to build capacity for future research projects, classroom activities, and other applied learning opportunities while emphasizing the relationships in understanding forest dynamics.

11	Title	Presenters	Institution/Organization
	Learning from the Land: Mycorrhizal Fungi and Symbiotic Relationships	Oren Hill-Sackatook	College of Menominee Nation

ABSTRACT

Climate change poses a significant threat to ecosystems and human well-being globally and across the Northern forest and in many regions of the world. Indigenous peoples who rely on forests for subsistence, sustainable land-based economies and cultural identity are particularly vulnerable to the effect of accelerating climate change impacts. College of Menominee Nation (CMN) Sustainable Development Institute (SDI), State University of New York (SUNY) - College of Environmental Science and Forestry (ESF), and Menominee Tribal Enterprises, a tribal forest management entity, have formed a unique partnership to address this issue. The project includes programs at multiple stages along the educational pathway to encourage Native students at the Associate, Baccalaureate and Master’s degree level.

This research project was developed by a Native student pursuing a Master’s degree at SUNY ESF and has been part of the LFLT project for the last two years. This presentation is from the perspective of the undergraduate CMN student who assisted with the project during the summer 2015 field season. The research project looks at how traditional ecological knowledge (TEK) and scientific ecology knowledge (SEK) can be used to understand mushroom data collected from the Menominee Forest and its links with the culturally important White Pine species. This is the last field season for this project and the data analysis will be ongoing through the fall 2015 semester. The results from this project will be featured as part of a national workshop hosted by CMN in Keshena, WI in early June 2016.

12	Title	Presenters	Institution/Organization
	Learning from the Land: Tree Regeneration Response to Oak Wilt Disease Control	Keith Kinpoway & Mario Kaquatosh	College of Menominee Nation

ABSTRACT

Climate change poses a significant threat to ecosystems and human well-being globally and across the Northern forest and in many regions of the world, especially in relation to other visible impacts through invasive species and/or diseases. Indigenous peoples who rely on forests for subsistence, sustainable land-based economies and cultural identity are particularly vulnerable to the effect of accelerating climate change impacts. College of Menominee Nation (CMN) Sustainable Development Institute (SDI), State University of New York (SUNY) - College of Environmental Science and Forestry (ESF), and Menominee Tribal Enterprises has formed a unique partnership to address this issue. The project includes programs at multiple stages along

the educational pathway to encourage Native students at the Associate, Baccalaureate and Master’s degree level.

This project developed by Menominee Tribal Enterprises provided student research experience on a real-world management issue. Four hundred and forty three oak wilt disease sites were salvage logged from 2008 through 2014 resulting in canopy gaps of different sizes and different residual trees and saplings in red oak forests on the Menominee Indian Reservation WI, USA. Disease spread was controlled by either oak stump removal with an excavator, girdle and herbicide treatment, or cut stump herbicide treatment. Ten sites were planted with tree species that are predicted to fare well under modeled climate change scenarios (Janowiak et. al. 2014). Tree regeneration responses and patterns are unknown at the remainder of the sites, which raises the question of whether planting is necessary if natural regeneration consists of adequate numbers of desirable species. Furthermore, is regeneration affected by timing of harvest, gap size, habitat type, disease control techniques, or other site factors (slope, aspect)? The LFTL interns spent the summer collecting data to assist MTE with developing a forest management plan to address the issue.

13	Title	Presenters	Institution/Organization
	Food Sovereignty in Light of Climate Change: Food Sovereignty Education	Citralina Hauró	College of Menominee Nation

ABSTRACT

A survey to assess the state of food security and food sovereignty on the Menominee Indian Tribe of Wisconsin’s reservation was conducted in 2014-15. Approximately 300 Menominee Indian Tribal Members surveyed identified the need to access fresh food, obtain cost affordable produce, and expressed the need for educational materials and information related to gardening. Climate change is destined to impact our agricultural systems; therefore, this project was framed to learn more about climate impacts on locally grown food. A second element of this project explored identifying the level of expertise needed to start and maintain a garden box. This research project was developed and implemented during the summer of 2015.

Five garden boxes were set up and monitored to determine the ease of gardening, humidity, precipitation, temperature, and the average of overall plant growth. The project considered that everyone may not have access to land for gardening purposes and the fact that not all people live in the same type of environment. For a control group, an in ground garden plot was selected that was located at the College of Menominee Nation’s Sustainable Development Institute’s Turtle Garden.

Along with the data collected, it was proven that a small garden plot is a great way to introduce children to gardening, and those adults who are unfamiliar with gardening are more apt to start if they can begin with a small garden bed.

14	Title	Presenters	Institution/Organization
	Mycorestoration of Terrestrial Lanscapes	Benjamin Barragan	Cankdeska Cikana Community College

ABSTRACT

This is a multi-phase project with students completing the different phases. The first phase has been completed by Moriah Thompson, while the second phase is underway and being performed by Benjamin Barragan. The first phase observed how *Pleurotus ostreatus*, a member of *Pleurotaceae*, can digest used motor oil. Previous studies have shown oyster mushrooms can process long chain hydrocarbons into quinones, that undergo ring cleavage yielding carbon dioxide and phthalic acids which is easily biodegradable. *Pleurotus ostreatus* have been used after tanker oil spills in the Pacific Ocean and the Gulf of Mexico for bioremediation (Dube and Fischer, 2014; Stamets, 2005), however, little research has been completed on terrestrial oils spills. This survey examined oil digestion process in local soils with varying amounts of oil to simulate small oil spills, such as from vehicular maintenance. During the second phase, the following species: *Agaricus brunnescens* (button mushroom), *Comprinus comatus* (shaggy mane), and *Pleurotus ostreatus* (oyster mushroom), and *Trametes versicolor* (turkey tail), will be examined to determine their ability to remove the heavy metals (arsenic, cadmium, lead, and mercury) from fly ash and crude oil. Each species of mushroom will be grown in the presence of 0%, 10%, 20%, 30%, 40%, and 50% content fly ash or crude oil by weight. The ability of mycelia to remove heavy metals from fly ash and crude oil is currently unknown. The ability of mycelia to also sequester the heavy metals from the soil may potentially reduce heavy metal uptake by crops therefore enhancing food safety. This potentially serves as a model to evaluate the use of mycelia in the bioremediation of oil contaminated soil and/or fly ash contaminated soil. Surveys will be completed with the cooperation of the Cankdeska Cikana Community College STEM department.

15	Title	Presenters	Institution/Organization
	Using Molecular Analysis to Determine the Genetic Health in a Bison herd on the Pine Ridge Reservation, SD	Tada Vargas	Oglala Lakota College

ABSTRACT

Before the 1800s, millions of bison (*Bison bison*) roamed a majority of North American. Within a short 80 years, “The Great Slaughter” diminished the entire population to just a few hundred. In an attempt to save the species and restore a viable population, crossbreeding bison with cattle (*Bos taurus*) was aggressively promoted. Today, North American bison populations exhibit a range of genetic purity depending on the history and management of individual herds. Determining the purity of a population is vital because at some point, the level of introgression will impact the individuals’ behavior and reproductive viability. This study assesses the introgression of cattle genes present in the Oglala Sioux Tribe’s bison herd. Maternal introgression, inherited through mitochondrial DNA, was determined by screening 900 individuals using a polymerase chain reaction (PCR) based assay. A subset of 336 individuals were screened for paternal introgression, inherited through nuclear DNA, using PCR amplification

with a panel of 18 nuclear DNA markers. The nuclear based assay product is genotyped to detect the presence of introgression. Our results showed no evidence of maternally inherited introgression with paternal introgression results still being analyzed. This study emphasizes the significance of genetic analysis of interspecies introgression for wildlife population management and species conservation. Furthermore, detailed knowledge of cattle introgression can be used by herd managers to develop strategies that best meet their management goals of restoring purity within a population.

16	Title	Presenters	Institution/Organization
	Developing Sustainable Technology among Tohono O’odham Communities	Richard Pablo	Tohono O’odham Community College

ABSTRACT

My name is Richard Pablo and I am the Project Assistant for our USDA NIFA Tribal research project that will use a new green material to make storage structures for seeds of many of the native crops that are adapted to this climate. The Project Director is David Stone of the Tohono O’odham Community College (dstone@tocc.edu, 520-288-0911). My job is to educate many of the outer communities here on the Nation about our project at the community college, which includes sustainable technologies like green materials, water conservation, agro-ecology, and solar power. More importantly, we need to get communities actively involved in the project to help them build their sustainability for future generations to come and especially dealing with climate change. Our Nation is located in the southern part of Arizona in the Sonoran Desert where temperatures are expected to rise in the near future. So we as a people have to think about the structure of our living condition and how we are to embrace the changes that are expected including food security and energy efficiency. So yes this is something to think about, not so much as a negative but more so as adapting and respectfully changing with the conditions and times. I feel this would be a great asset for the Tohono O'odham Nation.

17	Title	Presenters	Institution/Organization
	Measuring Ionizing Radiation Levels in Oglala Lakota County Soils on the Pine Ridge Reservation	Joel Shawn Garnette	Oglala Lakota College

ABSTRACT

Humans and animals exposed to elevated ionizing radiation levels may have an increased cancer risk. Oglala Lakota County on the Pine Ridge Indian Reservation experiences cancer rates well above the national average, which may be related to living near outcrops of uranium-bearing strata. To test the hypothesis that the radiation dose from uranium-bearing strata is significantly higher than the average dose across Oglala Lakota County, thirty locations from uranium-bearing strata were compared to thirty randomly-selected locations. Random locations were selected using the Create Random Points function in ArcGIS (ver. 10.2.2). Background ionizing radiation levels were measured (mR/hr) at a distance of 1m with a Geiger-Muller counter and were averaged over three 3-minute intervals. Radiation levels were plotted and then converted to a continuous layer using kriging. Future work includes measuring background

radiation at an additional 140 sites to expand the test area to cover the entire Pine Ridge Indian Reservation. Furthermore, soil samples collected at each site will be analyzed by digestion and constituent analysis by ICP-MS and a germanium detector. Alpha, Beta, and Gamma radiation will be identified using Alpha and Beta blockers.

18	Title	Presenters	Institution/Organization
	Controlling root graft spread of oak wilt using herbicide	Keith Kinepoway	College of Menominee Nation

ABSTRACT

As part of a research collaboration among Menominee Tribal Enterprises (MTE), College of Menominee Nation (CMN), and the State University of New York (SUNY) we embarked on a project to evaluate a technique to control an insidious invasive tree disease that is negatively affecting the Menominee Indian Reservation’s oak forests. A team of native forest health foresters and a native CMN student treated 98 oak wilt pockets using an herbicide applied to shallow chainsaw cuts at the base of diseased oaks to prevent the spread of the disease to neighboring healthy oaks. This technique is an alternative to removing the stumps with an excavator, which causes major disturbance to the soil and understory plants. Successfully controlling oak wilt with the least amount of site damage maintains the integrity of the oak forests, nurtures land-scape-level resilience to other emerging stressors such as climate change, and minimizes the opportunity for non-native plants to invade disturbed sites. Future work includes salvaging the diseased trees and post-treatment monitoring of the site to determine if the disease spread was stopped and if tree regeneration is adequate.

19	Title	Presenters	Institution/Organization
	The Revitalization of the Bimaaji’idiwin Garden	Kayla Jackson	Fond du Lac Tribal & Community College

ABSTRACT

The purpose of the Bimaaji’idiwin garden is to connect community members with resources to encourage their interest in growing and raising their own food. In the first year we hosted workshops on raising chickens, worked with the Ojibwe School’s Journey Garden students on starting plants and maintaining soil health, helped support a reservation Farmers Market, and demonstrated best production practices in the Bimaaji’idiwin Research and Demonstration garden. My poster will share how we revitalized the Bimaaji’idiwin garden and the agricultural outreach that was accomplished as a result of the garden program. I will also talk about the start of our seed saving program as well as future goals of the Bimaaji’idiwin program.

20	Title	Presenters	Institution/Organization
	A Scatological, technical, and photographic census of the carnivores in the North-East Corner of Oglala Lakota County in South Dakota.	Matthew L. Janis	Oglala Lakota College

ABSTRACT

In 2015, a study was conducted on local carnivores on the Pine Ridge Indian Reservation in South Dakota. Little is known about the population size, hunting territory, and ecological role of the carnivores in this area. Due to lack of research several species like the golden eagle (*Aquila chrysaetos*) and black-footed ferret (*Mustela nigripes*) populations are unknown, and may have declined due to over hunting and rodent range management. For 50+ years the Coyote's (*Canis latrans*) natural enemy and Apex predator the Grey Wolf (*Canis lupus*) has been absent from most parts of the U.S and without a natural enemy, thus making the coyote the dominate predator species in most ecosystems across the reservation. In 2012, a Grey Wolf migrated from Yellow Stone National Park to the Reservation where it fell victim to an oncoming car, this may indicate that they are migrating further and possibly looking for new territory. A GIS map was constructed of the Badlands in the North-East corner of Oglala Lakota County of South Dakota. Walking surveys, spot surveys, scat collecting, track identification, and camera trapping were conducted in the study area. Scat and tracks indicate that coyote occupy a majority of the badland area. Based on the results in the badlands there are two types of carnivores: terrestrial and aerial. These species are abundant for both the coyotes and Turkey vulture (*Cathartes aura*) populations, it is difficult to determine species density based on scat and track surveys alone. The tracks and scats may belong to the same pack in different areas, or a completely different population. Future research on the census for the entire badlands ecosystem will focus on the apex predators to identify which keystone species is at the top of the local food chain.

21	Title	Presenters	Institution/Organization
	Traditional and Modern Water Management Practices on the Tohono O'odham Nation	Duran Andrews, Richanda Miles, and Teresa Vavages	Tohono O'odham Community College

ABSTRACT

Do you ever think about how much water you use today on a individual basis. After you add it up it may not seem like a lot. Multiply that by the number of people however, and that number grows. There is talk of water shortages all over the world. People argue about the overuse and inappropriate use of water. On top of this we need to consider the effects of climate change, such as the extended droughts and their effect on the world's water budget.

How do we find sustainable water management practices to use so that shortages don't these don't happen here on the Tohono O'odham Nation? A historical tribe known as the Huhugam (i.e. the Hohokam) who were the predecessors to the Tohono O'odham, and lived in what is now Phoenix, Arizona constructed a canal system which was designed to distribute

water to communities or villages miles from the Gila and Salt rivers. This system allowed them to grow food to sustain a large population. The Tohono O’odham learned from this ecological technology.

After reviewing current issues with water management we will create an example of a water harvesting system at the Tohono O’odham community college West Campus experimental garden. We hope to accomplish a goal of beginning a ring water harvesting system that could be the example for other organization or individuals who want to start a rain water harvesting project of their own, even if they don’t have a suitable roof to use for this purpose.

22	Title	Presenters	Institution/Organization
	Important Plants to the Native Community of Noatak, Alaska	Shannon Wasuli	Southwestern Indian Polytechnic Institute

ABSTRACT

The project I will be presenting contains important facts of three native plants that are used by the Eskimo in the village of Noatak, Alaska. The three types of plants for this project will focus on the nutritional and medicinal values, as well as the structural housing purposes of the plants and trees. The Eskimo potato, *Hedysaryum alpinum*, is a plant that looks like small carrots which contains dietary fiber in the roots. *Artemisia tilesii*, also known as wormwood or stinkweed, is used as a beverage to cure common colds. *Picea glauca*, commonly known as white spruce, is used as wall frames to build log cabins.

23	Title	Presenters	Institution/Organization
	Three Native Plants Used by the Shoshone-Bannock Tribe	Killian Stacey	Southwestern Indian Polytechnic Institute

ABSTRACT

There are three native plants that are used by the Shoshone-Bannock tribe in Idaho. These three plants all have different purposes and uses to these indigenous people. *Salix exigua* or narrow leaf willow is used for medicinal purposes and it can be found growing near rivers, streams, ditches, or anywhere near water. Chokecherry is mostly used as a food source for humans and animals. The third plant is the lodgepole pine, this specific tree is used for structuring.

24	Title	Presenters	Institution/Organization
	Three Important Plants to the Navajo Community	Nathan Apache	Southwestern Indian Polytechnic Institute

ABSTRACT

This project contains three plant species that are found in Alamo, New Mexico and are essential to the Navajo. This project is also a literature review of the importance of these three plant species to the community. The three vital species in this project focus on medicinal and nutritional value of the plants. The application of plants utilized in the construction of hogans will

also be discussed. *Thelesperma megapotamicum* commonly known as Navajo tea, is used as a beverage to help cure multiple symptoms and purify the blood. *Juniperus monosperma*, otherwise known as one seed juniper, is commonly used in constructing traditional homes. Finally, *Zea mays* otherwise known as Indian blue corn, is important to native communities as a source of food and is used in ceremonies when a girl comes of age, among other things. These dynamic plants serve as key elements to the daily life of the Navajo people.

25	Title	Presenters	Institution/Organization
	Important Plants to the Zuni Tribe and Their Uses	Kenneth Epaloose	Southwestern Indian Polytechnic Institute

ABSTRACT

The Zuni has a long tradition of using plants for medicine, structure and food. This literature review is based on three plants that are important to the Zuni tribe. *Datura meteloides* otherwise known as Jimsonweed, is in the Solanaceae family and is used for medicine but can also cause death if not used appropriately. *Pectic angustifolia* otherwise known as Lemonweed is in the Asteraceae and it is used as a seasoning. *Yucca spp.*, also known as Alpine Yucca, is used to make baskets to store goods and for shampoo, and is in the Asparagaceae family. This literature review will be done using my general knowledge as a Zuni tribal member, the internet, plant books, and asking elders. These plants have native names which are part of this literature review. This literature review is an effort to understand in greater detail the uses of these plants and their importance to the Zuni tribe.

26	Title	Presenters	Institution/Organization
	Traditional Ecological Knowledge of Plans to Different Tribal Communities	Kyle Adson	Southwestern Indian Polytechnic Institute

ABSTRACT

The American Indian College Fund conducted listening sessions with Tribal Colleges and Universities in North Dakota, South Dakota, Wisconsin and Minnesota in 2013. Several principles that are viewed as foundational to programming with tribal nation communities emerged from this study including, preservation and restoration of Native life ways, intergenerational knowledge transfer, and place-based capacity building. This presentation will provide a snapshot of TCU programming in environmental sciences and sustainability fields and how students are targeting sustainability issues right in their tribal communities.

New Mexico Green Chile Production at the Los Lunas Agricultural Science Center

Loni Bernally

Institute of American Indian Arts

ABSTRACT

The Los Lunas Science Center is becoming the leading center for New Mexico pod type chile (*Capsicum*) research. New Mexico State University has been the center hub of chile pepper research, the cultivar 'New Mexico No. 9', released in 1921, was the first standardized New Mexico pod-type chile and opened the door to the chile processing and canning industry in New Mexico. Although it was the progenitor, it has since been replaced by many New Mexico pod-type cultivars, referred to as 'commercial cultivars,' that were bred and are grown for use in the southwestern United States. While these commercial cultivars are widely grown in southern New Mexico, in northern New Mexico many Native American Pueblo and Hispanic communities have long grown 'native chile', also known as the New Mexico landraces. Research into the landraces started at Los Lunas in 2011, these landraces were developed through continuous seed saving for more than four hundred years. The shorter growing season in northern New Mexico has likely resulted in early maturity observed in the landraces. Early maturity is a critical breeding goal for the commercial chile cultivars to extend harvest and the harvest season, so incorporating the early maturity of the landrace chile into commercial chile cultivars would be a valuable endeavor. The objectives of this study were to confirm early maturity in the landrace chiles; determine if early season physiological chile plant development correlates to early maturity; and characterize and document attributes of the landrace chiles compared to commercial cultivar standard controls. The landrace chiles tended to exhibit higher maturity index (MI) values, the differences were only consistently significant ($P=0.05$) in 'Jemez Pueblo' with a 2.03 and 1.66 MI average; and 'Santo Domingo Pueblo' with a 1.69 and 1.52 MI average for 2011 and 2012, respectively. In comparison, the commercial cultivars 'NuMex Heritage 6-4' had averages of 0.25 and 0.23 MI, and 'Big Jim' had 0.34 and 0.11 MI. These two early-maturing landraces also exhibited bud set on significantly higher nodes early in the season compared to the commercial cultivars; however node set evened out as the season progressed. The NM landrace chiles were also characterized and compared to the commercial cultivars. The commercial pod-type chiles had a higher total yield of fresh fruits, but the dry red yields were comparable to the landraces.

New Mexico landrace chile is threatened from a variety of issues such as, cross-pollination from other cultivars, economic issues resulting in some of the farmers moving out of farming all together, and the loss of arable farmland in northern New Mexico. Documenting and categorizing the different landraces is a crucial first step in order to try and protect the landraces for future generations.

Another research project going at Los Lunas is mechanical green chile harvest. As of now all green chile in the state is hand harvested making it a very labor-intensive crop and they are harvested twice during the season. The workforce has decreased by 5 percent since 2002, and during years when labor has been scarce a field may go unpicked, which is a serious economic loss for the growers. Mechanized harvests could eliminate this problem. As a result, NMSU has purchased a one-row, small-plot machine to do experiments at Los Lunas to fine-tune the variety and field production protocol to come up with the best scenario for a good, clean mechanical

harvest.

One experiment examined six different breeding lines and commercial cultivars to determine if the plant attributes impact the efficiency of the mechanical harvest. The other experiment focused on plant spacing as a way to get a more efficient mechanical harvest. Mechanically harvested red chile is planted closer and tends to make the plant taller which brings the fruit up off the ground; feeding plants feed the machine better. The issue is that if the plants are too close together, it can impact the size of the chile pod. The thinning treatments are planting 4, 8 and 12 inches apart to see the impact on the fruit and harvesting.

Lastly, there are breeding trials at Los Lunas dedicated to other Green Chile Mechanical harvestable, plants, Cayenne and Paprika varieties. Cayenne varieties are grown for their fruits that are generally dried and ground. They can also be pulped and baked into cakes, which are then ground and sifted to make the powdered spice of the same name. And there are the Paprika varieties that are grown for the red extractable coloring, which can be used for food coloring and paint.

28	Title	Presenters	Institution/Organization
	Climate Change & Weather Data Comparisons	Christina Coffman & Falon Torrez	Nebraska Indian Community College

ABSTRACT

Climate change has forced communities around the world to adapt to changing environmental conditions. This includes Indian Country. The purpose of this research project is to provide climate science information that will help our Tribal communities adapt to these changes. This research project compares state and national historical temperature and precipitation data to determine correlations and future trends. This research adds to the knowledge base of climate change and how climate change affects local communities.

29	Title	Presenters	Institution/Organization
	Building IAIA'S Land Grant Programs Capacity through the Americorps VISTA/TCU Program	Kelly Allen	Institute of American Indian Arts

ABSTRACT

The Institute of American Indian Arts is currently participating in the AmeriCorps VISTA (Volunteer in Service to America) Tribal Colleges and Universities Program. Kelly Allen, a recruited VISTA volunteer serves primarily to build the capacity of the college as a 1994 Equity and Education Land-Grant Institution. The IAIA provides educational and technical assistance to New Mexico's 22 Native American communities as well as the surrounding New Mexican community by executing programs in education, extension, and research. As a Land-Grant Institution, the IAIA specifically works to disseminate information related to USDA and non-USDA agricultural programs in order to support food security, health, and sustainability.

In 1993, the VISTA branch was incorporated into the AmeriCorps program network as a way to combat poverty within the United States. Members commit to serve alongside nonprofits organizations or public agencies to build their organizational, administrative, and

financial capacity. Following the close of their service, members receive either the Segal AmeriCorps Education Award or a post-service stipend.

Kelly serves as an indirect liaison between the Land Grant Programs and the community by compiling educational materials for farmers and ranchers, assisting in the development and implementation of Raised-Bed Gardening workshops, and by collaborating with community participants to design a Land Grant Program Advisory Committee. The latter collects stakeholder input and develops relationships between the college and the communities it serves by recruiting representatives from within the communities themselves. In this way, the Land-Grant Office is better able to support those it serves by identifying community needs.

Kelly also works with the Continuing Education department by developing Continuing Education courses with the Land Grant Programs and Physician’s Committee for Responsible Medicine (PCRM). Together with PCRM, the IAIA is able to pilot a Native Food for Life Diabetes Prevention Academy Conference Call Class series in a number of participating Tribal communities. By focusing on a traditional and plant-based diet protocol, PCRM and the Land-Grant office are able to integrate sustainable agricultural methods with healthy eating habits to prevent diet-related disease while encouraging food-sovereignty and the preservation of local foodways.

Faculty Section

30	Title	Presenters	Institution/Organization
	Proficiency, Pride & Prosperity (PPP) – Economics Built on Traditional Skills Arts strengthen the economy	Vonne Strobbe	Southwestern Indian Polytechnic Institute

ABSTRACT

The U.S. Bureau of Economic Analysis reports that the arts and culture sector represents 3.25 percent of the nation’s GDP—a larger share of the economy than tourism and agriculture. The nonprofit arts industry alone generates \$135 billion in economic activity annually (spending by organizations and their audiences) that supports 4.1 million jobs and generates \$22.3 billion in government revenue.

Goal 1: To provide instruction in traditional arts and crafts to at least 100 persons per year in an on-going program. PPP Artisans have been incredibly busy this year. Two series of art workshops were held in October and November 2014, one series of Native Belt Weaving instructed by a Master Artisan from Zuni Pueblo who is in PPP; and another series of Traditional Sewing led by one of PPP’s Senior Artisans of Santo Domingo Pueblo. Classes were full with waiting lists so the FEEP program hosted another sewing series in December 2014, and new PPP Weaving classes are scheduled for December 2015 and January 2016. Additional workshops are planned in wood burning; pottery making; and painting, the latter of which includes collaboration with SIPI’s recently awarded NASA Grant to create Wall Murals in the building being renovated for a MARS-like scenario. Finally, due to ongoing stakeholder requests from SIPI’s staff and students and tribal community members the PPP Program will continue to collaborate with the Family Education and Extension (FEEP) program by offering additional

traditional arts and crafts workshops. This is an important collaborative relationship because PPP wants to direct more funds for professional development trainings and workshops for recruited Native artists.

Goal 2: To provide instruction in small business management in an informal educational setting to at least 60 people per year with the idea of establishing their own home business. The PPP project continues to contribute to the artistic and cultural richness of Native artists by empowering them with trainings and resources that help them on their quests to obtain sustainable economic lives. PPP has held numerous workshops focusing on marketing opportunities such as Developing a Professional Portfolio and Art Marketing Plans; Utilizing Social Networks to Market your business. Many PPP artists have created their own Facebook pages and now understand the importance of using social networking to advertise themselves and their art businesses. And the PPP has established a Facebook page to network among the artisans while at the same time promote the program’s vision. Monthly PPP group meetings for the artisans create invaluable opportunities for feedback and collaboration. While these meetings elicit peer mentoring and networking the Coordinator and various guest speakers relay pertinent information and education on financial management and business basics. The PPP Coordinator and other specialists will continue to offer business basics in more informal educational settings. Monthly group meetings will continue to provide opportunities for active and potential program artisans to network among themselves. Participants will benefit from classes and meetings that have included education topics such as budgeting; recordkeeping; developing income and expenses worksheets; creating artist portfolios; and, learning how to price their products

31	Title	Presenters	Institution/Organization
	Summer Undergraduate Research Program: A strategy to engage North Dakota tribal college students in research	Pearl Walker-Swaney	North Dakota State University

ABSTRACT

In June, 2015 NDSU INBRE hosted a Summer Undergraduate Research Program (SURP) to engage North Dakota tribal college students in research. This program was in collaboration with NATURE (Nurturing American Tribal Undergraduate Research Experience). The NATURE program is a two week STEM and research program to engage tribal high school students in research. The SURP program was two weeks structured for tribal college students and included lab tours, research presentations by faculty and staff in various research fields, hands-on activities, strategies for educational success, and an opportunity to explore developing their own research proposals. The collaboration allowed SURP students to serve as role models and mentors to NATURE participants, increase in resources, and more extracurricular activities for students to partake in.

This presentation will discuss the outcomes of SURP and the goals for program improvement. The goal for SURP was to recruit 10 students from North Dakota tribal colleges. The program was able to recruit 8 students, in which half matriculated to NDSU for Fall Semester 2015. Outcomes of the program included students’ understanding of their learning style, interest in STEM and Public Health research, and meeting mentors at NDSU all increased by at least 25% or more. Program weaknesses found were constraints in the functioning of the

program such as the need for more program assistants and the need for more facilitation in developing their research proposals. Weaknesses shed light on areas for improving the program and the direction the planning committee will take for SURP 2016. Based on identified program weaknesses, the planning for SURP 2016 will include targeted curriculum that aligns with student interests in research, offering specific research training, enhancing recruitment strategies, and incorporating strengths found in SURP 2015.

32	Title	Presenters	Institution/Organization
	The association between year-round harvest and vocalizations of bison bulls during the rut in South Dakota	Alessandra Higa	Oglala Lakota College

ABSTRACT

The impact of selective harvest and “trophy” hunting on the demography of mammals is well documented. Despite the annual harvest of bison, however, little is known about how this iconic species responds to harvest disturbances or how the direct and indirect responses to harvest influence vocalizations associated with reproductive behavior. Therefore, we used an information theoretic approach to investigate the bellowing frequency of bulls in harvested (Pine Ridge Reservation bison pastures, SD) and non-harvested (Badlands National Park, SD) bison populations during rut. We recorded the bellowing frequency (i.e., total number of each distinct bellow) of bison bulls via continuous focal-sampling periods of 15 minutes using Vortex binoculars and Leica spotting scopes. We conducted 245 focal observations of 50 mature bulls from dawn to dusk between 1 July and 10 August 2013. Harvesting (i.e., removal of selected animals with firearms, or not), bull:cow ratio, number of attendant males, group size, and observation date accounted for > 50% of the variance in bellowing frequency between populations, with harvesting alone accounting for 36.1%. Our data suggest the need for longer-term studies to determine if harvesting has broad-scale impacts (either directly and/or indirectly) on bellowing frequency and possibly social and mating dynamics of bison. If so, then harvest regimes might be strategically designed to minimize these changes. This study is part of the Oglala Lakota College - Bison Project, funded by USDA-NIFA (award #2011-38424-30914).

33	Title	Presenters	Institution/Organization
	Family Education & Extension Program (FEEP)	Nancy Garcia	Southwestern Indian Polytechnic Institute

ABSTRACT

This program is a USDA/NIFA funded grant administered through the Board of Regents Office. The Goal of FEEP is to increase the number of Native American youth and families with the knowledge and skills to become healthy, productive financially secure, environmentally responsible members of society and to strengthen family members’ ability to serve as role models at home and within educational agencies in their tribal sites. Objective 1: On-going assessment of family and community needs and identification of additional resources to strengthen family and community partnerships. Objective 2: Develop and disseminate3 culturally appropriate family extension information and resource materials based on tribal needs

and requests. Objective 3: Continue to develop age-appropriate instructional materials lending library based on developmental practices that support the social, emotional, physical, and cognitive growth of children. Objective 4: Develop an interactive and collaborative relationship with families and educational agencies at tribal communities and with SIPI students and staff.

34	Title	Presenters	Institution/Organization
	Bat Conservation Research and the USDA NIFA Research Program at UTTC	Mandy Guinn	United Tribes Technical College

ABSTRACT

Concern about white-nose syndrome in bats has grown as the disease has entered the Midwestern states. In North Dakota, very little is known about species’ populations, distribution, diets, or behavioral ecology. One of the bat species known to occur in North Dakota was recently placed on the Threatened and Endangered Species list. Without basic biological data on this group of species, we will not be able to mitigate or even document losses to populations if white-nose syndrome or another disease enters the region. This situation provided an opportunity to initiate a novel research program based on a theme of filling a gap in regional expertise, enhancing our knowledge of several species of conservation concern, and training undergraduate students in advanced technology. The Bat Conservation Study at United Tribes Technical College began in 2012, with a USDA-NIFA Research award. The program established a partnership with researchers at North Dakota State University (NDSU) to develop the Broadening Achievements Together in STEM (BATS) program. The overall objective of the BATS project was to enrich STEM (Science, Technology, Engineering and Mathematics) research capacity at UTTC, increase recruitment and retention of Native American students, and produce high-quality graduates with an understanding of research methodologies and experience working with a team of scientists. In the three years the program has been offered, the program has provided nine UTTC students with summer research opportunities. Students in the BATS programs developed critical research skills needed to work on important and timely questions related to ecosystem health and sustainability using bat conservation research in North Dakota as a foundation. The USDA-NIFA award will continue to support an additional six undergraduate researchers over the next two years and has already expanded our network of partners and potential funding sources to sustain this long-term project.