



FALCON
October 25-26, 2026

Student Presentations					
Room	Student Presenters				
Student Panel 1 Mohave I-Kiva III	Kyla Kwandibens (CDKC)	Layla Wescot. (Menominee)	Lucy Summers. (Haskell)	Chenoa Webster (Menominee)	
Student Panel 2 Hacienda I-III	Brian Broken Leg (OLC)	Dontae Carpio, Tina Conroy (OLC)	Lowanala Uses the Knife (OLC)	Elisha Yellow Thunder (OLC, SD State)	Espy Dixon. Megan Little Hawk. (OLC)
Student Panel 3 Paloma I-III	Letisa Mailboy, Kaylee and Nevaeha Bochinclonny (SIPI)	Shalaya Slim, Cory Connie (Dine)	Juana Apachito and College Kellywood (Dine)	Ashleigh Chee and Shalaya Slim (Dine)	
Faculty Presentations					
Room	Faculty Presenter				
Faculty Panel 1 Mohave I-Kiva III	Ian Issaia McRhew. (SKC)	Adrian Quijada (TOCC)	Alessandra Higa (OLC)	Foster Sawyer (OLC)	Nick Klein (OLC)
Faculty Panel 2 Hacienda I-III	Kelsey Myhre (FDLTCC)	Steve Gebhard (FDLTCC)	Wendy GreenBerg (RLNC)	Angela Wall (Texas Tech)	
Faculty Panel 3 Paloma I-III	Courtney Natseway (Muscogee)	Dan Kinsey, James Swiere, Sonny Gray, Katelyn Goes Ahead, Truan Yellowstone (ANC)	Dr. Quincy Clark, Jennifer Freeman, Olivia Perez (Oregon State)	Lori Nelson (NHSC)	Henri Thompson. Katherne Hartman. (CDKCC)

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Student Poster and Oral Presentations

Chief Dull Knife College

Name: Kyla Kwandibens

Title: Good Medicine Garden Coloring Book

Location: Mohave I-Kiva III

Abstract: Chief Dull Knife College Extension Service's Good Medicine Gardens are non-traditional teaching and community gardens developed to increase food sovereignty and food access by providing open harvest to students and families on the Northern Cheyenne reservation. To build upon this work, staff created the Good Medicine Garden Coloring Book, a teaching tool that showcases plants grown locally in the gardens. Each plant is identified in both English and Cheyenne, with QR codes that pronounce and engage youth in learning the traditional names. A journaling section further invites reflection and connects youth with Cheyenne traditional ways and life.

The project's objectives are to strengthen cultural knowledge, foster intergenerational learning, and inspire healthier communities by blending art, language, and land-based education. Activities include youth gardening workshops, raised-bed installations for Elders, and the development of interactive, culturally grounded educational tools. By integrating coloring, journaling, and digital resources, the project offers multiple entry points for learning and healing that honor both tradition and innovation.

Once the book is released, youth will gain greater knowledge and confidence in gardening and plant identification, while Elders and teachers alike will have meaningful opportunities to share their wisdom. Families will be able to engage more deeply with cultural teachings, strengthening cultural awareness and supporting overall community wellness and sustainability.

Looking ahead, the Good Medicine Garden Coloring Book will grow into additional volumes, expanding beyond plant identification to include themes such as animal teachings, wellness practices, and community storytelling. These future resources will integrate interactive features such as QR codes linked to audio stories and digital materials, offering creative, culturally grounded approaches that promote healing, food sovereignty, and resilience.

College of the Menominee Nation

Name: Layla Wescott

Title: MTMS Children's Exploratory Journal

Location: Mohave I-Kiva III

Abstract: Traveling through Finland and Norway provided a powerful opportunity to learn from the Sámi people and witness their deep-rooted connection to land, tradition, and community. Immersing myself in Sámi culture through conversations, landscapes, and daily experiences expanded my understanding of different ways of life and deepened my respect for cultural resilience. Applying the six dimensions of the Menominee Theoretical Model of Sustainability, this journey profoundly influenced the creation of a children's exploratory journal. The journal invites young learners into meaningful reflection about identity, place, and change. Inspired by what I learned, I developed questions that encourage curiosity about how people live, adapt, and carry forward traditions. Observing the impact of modern changes on traditional Sámi life raised important ideas about continuity, adaptation, and respect for cultural knowledge. These themes are now gently woven into the journal's structure, offering children a way to explore the world with openness, empathy, and wonder.

Name: Cheno Webster

Title: Menominee Theoretical Model of Sustainability: Seven Strands of Inherent Awareness—Weaving Global Indigenous Methods Into Education

Location: Mohave I-Kiva III

Abstract: The Sustainable Development Institute and Teacher Education Department at the College of Menominee Nation (CMN) are advancing an educational initiative grounded in the Menominee Theoretical Model of Sustainability (MTMS). The MTMS, which encompasses six interrelated dimensions surrounding the core cultural concept of autochthony, being from the land, offers a framework for understanding human-environment relationships, interconnected systems, and cultural resilience. Building on this foundation, the Seven Strands of Inherent Awareness further articulate essential knowledge areas that promote youth development and early engagement with sustainability concepts: autochthony, land and sovereignty, natural environment, institutions, technology, economics, and human perception, activity, and behavior. This project aims to: (1) provide a traditional Menominee educational space that reintegrates Menominee culture into learning environments, (2) expand regional, national, and international engagement opportunities between CMN faculty, students, and other Indigenous peoples and institutions, and (3) broaden perspectives on culturally responsive pedagogy by developing curricula informed by global Indigenous knowledge systems.

By embedding the MTMS into teacher education and curriculum design, this initiative cultivates culturally grounded leadership and enhances educational practices for Indigenous and non-Indigenous communities alike. It nurtures inherent awareness as a

guiding principle, fostering profound connections to land, culture, community, and self, while equipping future generations with the critical thinking skills and sustainability knowledge necessary to address global challenges through Indigenous intellectual traditions and methods.

Dine College

Name: Shalaya Slim, Cory Connie

Title: Dine Wool Production

Location: Paloma I-III

Abstract: For years, Diné College has collaborated with Diné Sheep Producers to create opportunities in the wool market. However, following the COVID-19 pandemic, the national wool markets have nearly come to a standstill, presenting significant challenges for Diné Sheep Producers. One of the main difficulties has been accessing USDA programs that provide incentives for wool growers. As Diné College considers establishing a wool mill in light of the decline in the wool market, it is essential to conduct a feasibility study and develop programs that can support the Diné wool economy. We organized three wool purchases on the reservation in regional locations to accommodate and buy producers' wool. Additionally, Diné College Land Grant interns will share their experiences, challenges, and opportunities as they assist in the 2025 Navajo Nation Wool Buy.

Name: Juana Apachito & Colleen Kellywood

Title: Diné College Land Grant Office: Extension Programs

Location: Paloma I-III

Abstract: Diné College's Land Grant Office extension and outreach programs provide technical service and outreach to Navajo ranchers, farmers, families, and youth to reconnect to the land, language, and culture by embracing values of the Navajo people. The program's objective is to expand and improve community outreach services in youth development, rangeland, farming, and livestock management. The Tsaile campus is the main office and has provided several programs to the community such as beef cattle reproduction seminars, range monitoring, environmental youth camps, illegal dumping workshops, and wool production. The second office is located in Shiprock, NM where they work with food producers providing workshops and summits regarding harvesting and food preparation, from field to plate. Overall, Diné College's Land Grant Office works to disseminate information that helps provide the community with culturally relevant agricultural practices.

Name: Ashleigh Chee & Shalaya Slim

Title: Cultivating Future Land Stewards: Agricultural Science Education for Diné Youth

Location: Paloma I-III

Abstract: Diné College's Agricultural Science program is designed to prepare a new generation of land stewards by integrating Navajo cultural knowledge with Western scientific approaches. This program emphasizes a respectful balance between traditional teachings and modern science, fostering students' ability to make informed decisions for their communities and environment. Through opportunities such as dual credit enrollment, high school students gain early exposure to agriculture, build academic confidence, and earn college credit while exploring career pathways. By blending cultural values with scientific training, the Agricultural Science program equips students to contribute meaningfully to sustainable agriculture and food sovereignty within the Navajo Nation and beyond.

Haskell Indian Nations University

Name: Lucy Summers

Title: Comparing Vegetation Diversity Between Remnant and Restored Wetlands on the Wakarusa Floodplains

Location: Mohave I-Kiva III

Abstract: Active land restoration efforts have been ongoing in the wetlands of Haskell Indian Nations University since a road was removed from the middle of the wetlands over 20 years ago. Efforts to restore the plant communities have focused on removing aggressive invasive species like *Dipsacus* spp. As a part of this restoration effort several casual surveys of the plant communities in the wetlands have built a species list. These lists document what plants are present in the wetland community, but do not address their percentage cover and or effect on the surrounding area. This project's objective is to measure species richness, frequency and percentage cover using quadrats and transects in the Haskell wetlands as well as to compare this data to a nearby remnant wetland within the same floodplain. These wetlands were once used as farmland to teach the Indian boarding school children how to farm. Today, these wetlands serve as an outdoor laboratory for students, as well as a place for culturally important plants. Supported by the USDA Equity Grant, undergraduate student researchers from the Haskell Greenhouse gain valuable experience conducting environmental research at Haskell as well as healing the disturbed land. By quantifying the wetland plant communities, this project contributes to important baseline data that will aid monitoring wetland restoration outcomes and support ongoing invasive species control.

Oglala Lakota College

Name: Brian Broken Leg

Title: Distribution and Habitat Suitability of Western Meadowlark (*Sturnella Neglecta*)

Location: Hacienda I-III

Abstract: The western meadowlark are considered a flagship and management-indicator species. They are a sign of good health and biodiversity of prairie grassland but contrary to this prairie grasslands without the presence of western meadowlark have poor health. Although the benefits of western meadowlarks has been known, there has been little to no studies on species distribution of meadowlark.

The purpose of this study was to develop a habitat suitability model and create a distribution map. The variable indicators that were used in this study were mostly climate data. Code was used to run through a correlation matrix to find which variable indicators would work best. There were eight variable indicators that were selected from the correlation matrix. These eight variable indicators were then used to find both the habitat suitability model and distribution map.

This work is funded by NSF TCUP and USDA NIFA

Name: Dontae Carpio, Tina Conroy

Title: Wicayajipa Tunkce (Bees with Purpose) at Oyate Owoju (Garden for the People)

Location: Hacienda I-III

Abstract: The Oyate Owoju (“Garden for the People”) project, launched in 2022 at Oglala Lakota College’s He Sapa Center, transformed a former parking lot into a living classroom and community space. Inspired by the HSCC director's vision, the garden serves as a place where students can study, pray, relax, and reconnect with nature. With support from a USDA NIFA Extension grant, the project has established over a dozen raised beds across 0.225 acres, a 32 ft x 81 in Three Sisters garden, and three Italian honeybee hives. These efforts integrate Lakota cultural values with sustainable practices, bridging traditional ecological knowledge with modern food production.

Key objectives include restoring pollinators for food security, educating the community about pollinator and environmental stewardship, promoting composting and recycling, and providing hands-on learning in beekeeping. Activities range from food preservation and seed collection to cultivating plants for teas and enhancing OLC’s Lakota Traditional Plants curriculum. Produce is used to provide meals for students and the community, reinforcing food sovereignty and cultural continuity.

The impacts are evident: the introduction of bees addressed pollination gaps, enabling plants to flower, set seed, and strengthen biodiversity. The garden has become a hub for learning, tours, and environmental awareness, where stewardship of Grandmother Earth

is practiced and shared. Beekeeping now serves as a hands-on tool for teaching pollinator conservation, food production, and ecological resilience.

Future plans focus on expansion to OLC's main campus to train new beekeepers, develop curriculum-based beekeeping education, and offer youth internships. Additional goals include greenhouse-based year-round food production with bumblebees, seed banking of heirloom and non-GMO varieties, and continued promotion of sustainable agriculture grounded in Lakota values.

Name: Lowanla Uses the Knife

Title: Isolation and characterization of nitrogen-fixing cyanobacteria for application in solar-driven renewable energy

Location: Hacienda I-III

Abstract: Cyanobacteria are photosynthetic microbes that can fix atmospheric dinitrogen and carbon dioxide to yield bioproducts that could benefit humans, animals and the environment. They are widely distributed in the environment, and our study location of West River SD is well-suited for isolating N-fixing cyanobacteria as there is limited use of chemical fertilizers and a variety of habitats. The region also has good potential for solar power and the large reservation areas of West River SD need more affordable and renewable energy. This project explores locally isolated cyanobacteria for their potential application in solar-powered fuel cells. Over the next year, we will characterize and perform genomic sequencing of several isolates followed by prototyping of cyanobacterial fuel cells in Summer 2026.

We sampled soil and water from Yellow Bear Dam near Allen, SD as well as prairie near Long Valley, SD on the Pine Ridge reservation. Samples were diluted in BG-110 nitrogen-free media and transferred several times to produce enrichment cultures. Those cultures with green growth were plated onto BG-110 agar dishes to isolate individual colonies. Cyanobacterial isolates were imaged using the automated Keyence fluorescence microscope. Genomic DNA was isolated using Qiagen Genomic-tips kits to obtain high-purity, long fragments to enable sequencing using Oxford Nanopore Technologies MinION next-generation sequencing.

Over the current academic year, we will complete sequencing, assembly, and annotation of isolates as well as begin characterization of metabolites by GC-MS. During Summer 2026 we plan to prototype solar fuel cells using isolated cyanobacteria, in collaboration with SD Mines which has extensive experience in designing bioreactors. Long-term, we hope this work will lead to more renewable, affordable energy resources for families and communities in the region as well as creating new job opportunities.

This work is funded by NSF E-RISE and USDA NIFA.

Name Elisha Yellow Thunder

Title Relationality in Science - The Sand In Our Eyes

Location: Hacienda I-III

Abstract Agricultural systems are classic examples of complex socio-ecological networks, where isolated analysis of variables fails to capture the dynamic interactions that determine outcomes. This dissertation argues that the construction of an Agricultural Data Cube—a spatio-temporal repository of diverse data layers—must be guided by the theoretical framework of relationality to be truly effective. It posits that the data cube is not a neutral container but a relational model, whose structure and analytical potential are derived from the connections it encodes between soil, climate, vegetation, and human activity. The research employs a methodology grounded in three relational principles: systems thinking, through the integration of interdisciplinary datasets; contextual fundamentality, by preserving the spatial and temporal provenance of each data point; and co-creation, by reflexively designing for end-user context. The resulting data cube demonstrates that a relational approach moves beyond a technical tool to become a platform for uncovering the emergent properties of agricultural landscapes, thereby offering a more holistic and actionable basis for sustainable management and policy. This work bridges critical theory and data science, asserting that the future of robust environmental informatics lies in its capacity to model interconnection.

This work is funded in part by USDA NIFA TCRGP.

Southwestern Indian Polytechnic Institute - Natural Resources Program

Name: Letisha Mailboy, Kaylee and Nevaeha Bochinclonny

Title: Digital Storytelling: Cultivating SIPI's Garden Story

Location: Paloma I-III

Abstract: This presentation highlights the use of digital storytelling through ESRI's ArcGIS Story Maps to document and share the growth, engagement, and diverse uses of the campus Three Sisters Garden (TSG) at Southwestern Indian Polytechnic Institute (SIPI) in Albuquerque, NM. The garden functions as a collaborative space for student projects, cultural learning, demonstrations, and civic engagement. By combining a variety of media, we've created interactive narratives that support efforts around food sovereignty, environmental sustainability, food and cultural preservation. The presentation will feature examples of how students and the greater campus community use the garden. Digital storytelling can be a valuable tool to communicate the garden's impact, enhance engagement, deepen student learning, and support SIPI's land-grant mission.

Faculty Lead - Angeline Sells, Natural Resources Program/Ag Instructor
angeline.sells@bie.edu

Student Oral Presentations Only

Oglala Lakota College

Name Lena Goings, Esperanza Dixon, Megan Little Hawk

Title: Wazi Ahanhan Owayawa Wankatun Ta Owoju Embracing Lakota Values through Community Gardening

Abstract The Oglala Lakota College Pine Ridge College Center Community Garden project, funded through the OLC Ag Extension NIFA grant, promotes food independence and sustainability within the Lakota community by reconnecting students and families to traditional gardening practices and modern techniques grounded in cultural values. Born from a community-led discussion on local needs, the project strengthens land stewardship, community ties, and overall well-being through hands-on engagement with the land.

The primary objectives are to promote sustainable practices rooted in Lakota traditions, enhance cultural exchange, and empower individuals with knowledge of gardening and food preservation. Key activities include designing and planting a community garden guided by the Lakota Medicine Wheel, symbolizing balance, life cycles, and interconnectedness. The garden features culturally significant plants such as chokecherry, sage, and sweetgrass, and hosts workshops on sustainable gardening, traditional cooking, harvesting plants and berries, and community events that support cultural sharing and education.

Impacts include improved community health through active engagement with the land, strengthened cultural identity, and increased self-sufficiency through traditional food systems. The garden also serves as a sanctuary for holistic health and cultural learning, deepening connections to Lakota heritage while addressing local food security.

The project is implemented in seasonal phases—planning, planting, and ongoing education—to ensure long-term growth and sustainability. Future plans include expanding the site with a greenhouse or hoop house, integrating chickens and bees, and creating year-round opportunities for food production, research, and cultural exchange. By centering Lakota values in both daily life and educational programming, the OLC Pine Ridge College Center Community Garden provides a living model for sustainability and cultural preservation on the Pine Ridge Indian Reservation.

College of the Menominee Nation

Name: Chenoa Webster

Title: Menominee Theoretical Model of Sustainability: Seven Strands of Inherent Awareness—Weaving Global Indigenous Methods Into Education

Abstract: The Sustainable Development Institute and Teacher Education Department at the College of Menominee Nation (CMN) are advancing an educational initiative grounded in the Menominee Theoretical Model of Sustainability (MTMS). The MTMS, which encompasses six interrelated dimensions surrounding the core cultural concept of autochthony, being from the land, offers a framework for understanding human-environment relationships, interconnected systems, and cultural resilience. Building on this foundation, the Seven Strands of Inherent Awareness further articulate essential knowledge areas that promote youth development and early engagement with sustainability concepts: autochthony, land and sovereignty, natural environment, institutions, technology, economics, and human perception, activity, and behavior. This project aims to: (1) provide a traditional Menominee educational space that reintegrates

Menominee culture into learning environments, (2) expand regional, national, and international engagement opportunities between CMN faculty, students, and other Indigenous peoples and institutions, and (3) broaden perspectives on culturally responsive pedagogy by developing curricula informed by global Indigenous knowledge systems.

By embedding the MTMS into teacher education and curriculum design, this initiative cultivates culturally grounded leadership and enhances educational practices for Indigenous and non-Indigenous communities alike. It nurtures inherent awareness as a guiding principle, fostering profound connections to land, culture, community, and self, while equipping future generations with the critical thinking skills and sustainability knowledge necessary to address global challenges through Indigenous intellectual traditions and methods.

Student Poster Presentations Only

Blackfeet Community College

Name: Joslyn McKay

Title: Ksisskstaki (Beaver) Soil

Abstract: Blackfeet Community College: U.S.D.A. Equity Cohort, 2024-25. To use an ancient process of soil preparation handed down by Ksisskstaki (Beaver) to Piikuni men for their tobacco gardens. Clay soil was used along with materials from the environment to create a healthy soil. The process of trial and error was utilized until a combination of the right ingredients was found. The soil will provide a new ethical way of achieving health and sustenance by helping people avoid harmful containments from store bought products. The process will be taught to people through C.E.U. workshops and classes at Blackfeet Community College. This will create a ripple effect of good health throughout the community and for people who want to further their education can enroll at B.F.C.C.

Name: Rylee Bird Rattler

Title: Sing Maatoyi (Grass) Forage to Replicate the Migration of Iinii (Bison)

Abstract: Using Maatoyi (Grass) Forage to Replicate the Migration of Iinii (Bison)
As a bio-cultural keystone species of the Blackfeet Nation, bison once shaped grassland ecosystems by enhancing soil health, promoting plant diversity, and supporting ecological resilience. Following their near-extinction and significant changes in land use, these natural processes have been disrupted. Now, as Iinii (buffalo) return to tribal lands, there is an urgent need to restore the ecological functions they once performed. This study investigates whether targeted grassland management can replicate the effects of bison migration. By analyzing grass growth and nutrient cycles, we explore how harvesting and managing native prairie grasses can simulate the ecological role of migrating herds. Our approach begins with our Blackfeet Community College native grasslands where we manage 15.4 acres in the absence of large-scale bison populations and then supplying this grass to existing herds in a way that mimics seasonal migration patterns. The goal is to restore Northern Plains plant communities that support biodiversity, and promote long-term sustainability through a culturally grounded ecological practice.

College of Menominee Nation

Name: Savannah Hackey

Title: Building a Northern Fruit Tree Consortium

Abstract: The purpose of Building a Northern Fruit Tree Consortium, is to increase the local fruit production and availability within Indigenous communities to make for better health and wellness for current and future generations. This multi-year project has already made an impact, with local and regional partners building evaluations plots to observe and care for Pamela Plum trees, learning what conditions and maintenance they need in order to produce plentiful fruits. This also broadens the agricultural workforce, knowledge and total fruit production for greatest impact on health and wellness. Through this project we hope to provide locally grown plums to the areas as a healthy food option.

Name: Mary Fisher

Title: Next-Gen FAHN Club Summer Program

Abstract: 15 middle school students participated in the FAHN Club through the Menominee Tribal School's summer program. The students planted and maintained a Three Sisters Garden, learning traditional agricultural practices involving blue corn, beans, watermelon, and sunflowers. Plans were made for students to return in the fall to harvest crops and host a community husking bee, engaging families in cultural food practices.

Students participated in a 2-day fish shocking field study with the Menominee Tribal Environmental Fish Biologist, gaining firsthand experience in aquatic ecosystem monitoring.

They completed a canoe-based natural resource exploration of the Wolf River using DOCE canoes, integrating traditional transport with environmental education. They were allowed tour the large and small Menominee Tribal Enterprises sawmills were conducted, providing students with insight into local forestry and wood industry careers. Multiple career exploration field trips were completed, showcasing real-world professionals in Forestry, Agriculture, Human Sciences, and Natural Resources. The program delivered culturally grounded STEM education that integrated Indigenous knowledge, local expertise, and place-based learning. Strong partnership was formed between FAHN Club and Menominee Tribal School, setting the foundation for potential future program growth

Dine College

Name: Lavine John, Cauy Bia, Erin Cleveland

Title: Fungal Associations and Potential Mycotoxin Risks in Pinyon Pine Nuts (*Pinus edulis*) from Managed and Unmanaged Woodlands

Abstract: In Tsaile, Arizona, pinyon pine (*Pinus edulis*) and juniper woodlands are in decline due to habitat loss, overharvesting, and a changing climate. Pinyon nuts are a vital food and medicine source for the Diné people, yet little is known about how fungi affect nut quality and safety. While many fungi are beneficial, some can cause disease or produce harmful mycotoxins, raising concerns for both tree health and public health. This study aimed to assess whether fungal community composition differs between healthy and declining *P. edulis* trees and whether these fungi include beneficial symbionts or potential pathogens. In summer 2025, cones, buds, and needles were collected from thinned (treated) and untreated (control) woodlands. From each plot, 20 healthy and 20 declining trees were randomly identified. All 40 healthy trees were successfully sampled, whereas only 30 of the declining trees produced cones suitable for sampling. Samples were surface-sterilized, plated using culture-dependent methods, and assessed for fungal growth. Representative isolates are being identified through genetic sequencing to characterize community composition. Through this work, we hope to develop standardized methods for cone and needle sampling, sterilization, and culturing in *P. edulis*. Results will clarify the impacts of forest management and tree health on fungal community structure and nut safety, with implications for woodland resilience, food quality, and public health.

Names: Cauy Bia (Oral Speaker), Erin Cleveland, Lavine John

Title: Fungal Endophytes and Potential Pathogens in Healthy and Declining Piñon Pine (*Pinus edulis*)

Abstract: In the summer of 2025, widespread decline of *Pinus edulis* (piñon pine) was observed across the Navajo Nation, with trees showing scorched needles, branch dieback, and bark abnormalities. Mortality was most severe near roads and in thinned plots, suggesting a correlation between management practices and environmental stress. This study investigated fungal endophytes and potential pathogens in declining and healthy piñons near Diné College in Tsaile, Arizona. Using an Aseptic Core Boring (ACB) method, 280 tissues were collected from 40 trees and cultured for fungal isolation. The ACB method reduced contamination to 1%, compared to 15% in traditional boring, improving endophyte recovery. Sixteen isolates were obtained, most from declining trees, this inferred an association between fungal colonization and symptomatic *P. edulis*. These findings build insight into piñon tree health and support the development of disease management protocols for forests across the Navajo Nation

Fon du Lac Tribal and Community College

Name: Katrina Engel

Title: Gardens

Abstract: Our campus gardens are more than green spaces, they are ecosystems for education, sustainability, and community engagement. This poster showcases the multifaceted roles these gardens play in students' lives and academic research. Students have access to personal growing plots, empowering them to cultivate their own food and deepen their understanding of food systems. The Environmental institution at Fon du lac college has many growing spaces, each serving a unique purpose. Hugel mounds flourish as vibrant pollinator gardens, while dorm gardens provide fresh, homegrown food for students living on campus. A welcoming Herb Garden invites anyone in the campus community to harvest freely. A newly established "Three Sisters" corn field showcases Indigenous farming practices, honoring traditional agricultural wisdom. Students also construct and manage a seasonal high tunnel, which supports both research and produce cultivation. For the first time this past summer, students sold their harvest at a local farmers market blending hands on learning with entrepreneurship and community engagement. We're excited about the future of our campus grow spaces. Plans are underway to host more farmers markets, creating vibrant opportunities for community engagement and fresh, local produce. We're also exploring ways to expand and improve our compost system, making it larger and more accessible to everyone. Additionally, we're considering installing a wash table closer to the growing areas to streamline harvesting and cleaning. Someday I am hoping to see more pollinator flowers spread around the school.

Name: Katrina Engel

Status: Student

Title: Cultivating Community through Student Led Growing Spaces at FDLTCC

Abstract: Our campus gardens are more than green spaces, they are ecosystems for education, sustainability, and community engagement. This poster showcases the multifaceted roles these gardens play in students' lives and academic research. Students have access to personal growing plots, empowering them to cultivate their own food and deepen their understanding of food systems. The Environmental Institute at Fond du Lac Tribal and Community College has many growing spaces, each serving a unique purpose. Hugel mounds flourish as vibrant pollinator gardens, while dorm gardens provide fresh, homegrown food for students living on campus. A welcoming Herb Garden invites anyone in the campus community to harvest freely. A newly established "Three Sisters" field plot showcases Indigenous farming practices, honoring traditional agricultural practices. There is also a seasonal high tunnel which supports both student research and produce production for on-campus and community programming. Opportunities for students in campus growing spaces involve the construction and management of the gardens, seed starting, harvesting, and seed saving. Students also sold their harvest at a local farmers market for the first time this past summer, blending hands on learning with entrepreneurship and community engagement. We're excited about the future of our

campus growing spaces. Plans are underway to host more farmers markets, creating vibrant opportunities for community engagement and fresh, local produce. We're also exploring ways to expand and improve our compost system, making it larger and more accessible to everyone. Additionally, we're considering installing a wash table closer to the growing areas to streamline harvesting and cleaning. Finally, ecological restoration projects are planned to increase the number of pollinator plants around campus.

Name: Zoie Soder

Title: Bird Deaths Via Window Impact on the Fond du Lac Tribal and Community College Campus

Abstract: Fond du Lac Tribal and Community College (FDLTCC) is a campus in the middle of a red pine plantation with heavy natural lighting in the form of windows. However, one downside of the large windows is the bird deaths it causes. The purpose of this project is to find how many, and which species of birds are dying from window impacts on the FDLTCC campus. To determine this, we conduct routine walks of the perimeter of the main campus building where we record the birds that fall victim to the large windows. Through two years of observation, we have identified two major areas of campus that hold the most bird deaths. By finding the hot spots we can find the best area to put preventative measures on the windows in the future. We plan to implement deterrents on select windows on campus and continue to monitor the impact they provide on reducing the amount of bird deaths on FDLTCC campus.

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Name: Georgia Morris

Title: Monitoring Dwarf Bilberry (*Vaccinium caespitosum*) in the Superior National Forest

Abstract: The Plouff Creek area supports the highest known population of dwarf bilberry (*Vaccinium caespitosum*) within the Superior National Forest. The dwarf bilberry plant is essential to Nabokov's Blue Butterfly (*Plebejus idas nabokovi*), a species of special concern in Minnesota, as it is the exclusive host plant for Nabokov's Blue larvae. Like other *Vaccinium* species, bilberry is a fire dependent obligate. The Plouff Creek Dwarf Bilberry Habitat Enhancement Project has reintroduced fire to combat the encroachment of trees and shrubs in areas dense with dwarf bilberry, preventing the plant from being shaded out. The purpose of this project is to evaluate whether prescribed fire can effectively enhance dwarf bilberry populations and, in turn, improve habitat conditions for Nabokov's Blue Butterfly. For the past three years, Fond du Lac Tribal and Community College (FDLTCC) students have assisted the United States Forest Service (USFS) with monitoring these sites to evaluate the effectiveness of the burn treatments in Plouff Creek by collecting data on eight metrics (e.g., dwarf bilberry, other vacciniums, hawkweed) using a nested frequency sampling design. There are a total of eight subunits located within the Plouff Creek area, and during the summer of 2025 we monitored three of these subunits, totaling 219 plots sampled. A GPS was used to locate each plot along north-south transects, with sampling conducted using a 1 m² sampling frame. The monitoring efforts have revealed that the rotational burns are having a positive impact on maintaining the dwarf bilberry populations in the area. The USFS plans to continue exploring the frequency of rotational burns that yields the most success.

Name: Payton Stull

Title: Mapping Vernal Pool Hydroperiod using Snowmelt Timing and Satellite Observations in Northeastern Minnesota

Abstract: Vernal pools are temporary wetlands that provide critical breeding habitat for amphibians and invertebrates, yet their seasonal hydroperiods are difficult to monitor at broad scales. Snowmelt is a key driver of pool filling and drying in northern climates, and climate change is altering snowpack and melt dynamics with implications for wetland ecology and biodiversity.

This study evaluated whether snowmelt timing observed from ground-based records can serve as an indicator of pool fill date, and if satellite imagery can capture pool drying, together providing an estimate of hydroperiod. The objective was to test a proof-of-concept workflow that integrates snowmelt data with satellite observations to improve monitoring of ephemeral wetlands.

Potential vernal pools were identified using data from the National Wetlands Inventory filtered through soil and hydrological layers in ArcGIS. Snowmelt timing was derived from local snow pole time lapse photography records, and pool presence was evaluated with Sentinel-2 imagery using visible and shortwave infrared bands. Fill and dry dates were compared to snowmelt timing to estimate hydroperiod duration.

Results from one focal site (Fox Farm Road) showed that the pool began filling the same day of last snowmelt (April 10, 2024) and was drying by June 12, showing a hydroperiod of approximately 62 days. Multi-year trends suggest that pools across the region are both filling and drying earlier, consistent with earlier snowmelt patterns. Satellite detection aligned with snowmelt timing, but pool size and 10m resolution was insufficient for accurate detection of smaller wetlands

This proof-of-concept demonstrates the potential for integrating snowmelt data and satellite imagery to monitor ephemeral wetland dynamics at a regional scale. Future work will incorporate higher-resolution sensors, in-pool loggers, and expanded site comparisons to refine accuracy and support conservation planning under changing climate conditions.

Name: Edwin L. Erickson

Title: The Soil Scoop: Participation in a Two-Week Soils Course Across Northern Minnesota

Abstract: Soils are interwoven with hydrology, ecosystems, and climate, resulting in a wide diversity of soil types that are complicated and nuanced to classify. Soil science plays an important role in infrastructure, environmental studies, ecology, natural resources, and human safety and well-being. However, there are less emerging skilled soil scientists than meets the current demand. Students from Fond du Lac Tribal and Community College (FDLTCC) and Leech Lake Tribal College had the opportunity to participate in a two-week soils class hosted by the University of Minnesota (UMN), Minnesota Department of Natural Resources, and the U.S. Forest Service across Northeastern and Northwestern Minnesota to provide training and field experience in hopes to inspire and educate future soil scientists. During the course, we analyzed, collected, and compared soil samples with their glacial history. The first week we collected soil samples and analyzed soil pits and practiced texturing and classifying at UMN Cloquet Forestry Center on the Superior Lobe, slightly North on the Rainey Lobe, and ended each day with a full environmental and geological analysis. The following week brought us to tour the Marcell Experimental Laboratory and then westward from the Leech Lake area to the Red River Valley to conduct similar soil pit analyses. We received a certification of course completion and gained connections to further research and employment opportunities. Agencies working together helped create an extensive soil analysis with a remarkably short amount of time and energy which helped enhance learning retention and contextual knowledge. Multiple core samples across the state were saved and donated to FDLTCC for future education. Students cured soil samples, and I plan to compile background information and field insight to build curriculum for existing classes.

Haskell Indian Nations University

Name: Aiyanna Tanyan

Title: Revitalizing Traditional Food ways through Campus Gardens

Abstract: Haskell Indian Nations University's campus greenhouse and gardens provide students with opportunities to help advance Indigenous-led food sovereignty. Our efforts aim to help students reconnect with culturally significant foods. This project began with the intent to increase student access to edible and medicinal plants while demonstrating how traditional agriculture can be implemented in our campus spaces. We began by starting seeds in the greenhouse. We transplanted them into outdoor plots, including Three Sisters gardens in front of the Tommaney Library, raised beds by student dorms, and additional mounds for corn and tobacco. Crops included tomatoes, tomatillos, basil, onions, peppers, squash, Seneca Blue Corn, Hopi Blue Corn, and Mvskoke tobacco. The project's impact has created student engagement, access to culturally relevant foods, and the revitalization of traditional agriculture. This initiative provides students with fresh produce and highlights the role of traditional ecological knowledge in sustainability and sovereignty. Moving forward, we plan to expand these efforts by involving more students in starting seeds, planting, increasing the diversity of traditional crops, and creating educational workshops. We hope to encourage students to implement food sovereignty practices within their Tribal communities.

Fond Du Lac Tribal and Community College

Name: Jerron Ojibway

Title: Evaluating the Effectiveness of Manoomin Hulls as Mulch

Abstract: As we come to know Manoomin (wild rice) is a staple traditional food source of the Anishinaabe culture. The wild rice husks removed from the parching and winnowing process of harvesting wild rice are often discarded as a byproduct of the ricing process but regarding how effective wild rice mulch is at retaining soil moisture and its ability to sustain weed suppression. Six raised beds consist of varying thickness of wild rice hull mulch that received differences in the amount they were watered. We redesigned how we collected soil moisture measurements by installing sample ports on the sides of the raised beds for quick access of LabQuest data from the probe to measure daily soil moisture efficiently. Continuous data was recorded via HOBO sensors for soil moisture and temperature, as well as weather data. Weed suppression was measured by calculating biomass and recorded the number of weeds in each of the raised beds. In conclusion, the sustainable impact on agriculture with the usage of wild rice hulls suggests a viable aspect in the agricultural industry. The data from this study will be used to recommend how use of certain depths of Manoomin hull mulch can be practical in gardening and in the agricultural industry.

Lac Courte Oreilles Ojibwe University

Name: Cody Atchison

Title: Makak: Co-designing Environmental Sensors to Protect Manoomin

Abstract: My poster shows a little about the designing of the Makak sensor at the STRONG Manoomin Collective. I interned for them over this last summer and conducted validation testing on a Makak sensor. The Makak is a sensor that is being deployed in Manoomin beds across northern Minnesota, Wisconsin and the U.P. of Michigan to get environmental data from Manoomin (wild rice) beds to help with the further work being done to protect and also expand the current state of wild rice in the region. This sensor is also something that can be used in any wetland environment and that is something the Collective is also looking into for future research and study.

Little Big Horn College

Name: Jolee Whiteclay, Anna Ten Bear

Title: Family Healing Gardens Project

Abstract: Our poster presentation will emphasize the importance of the "Family Healing Gardens" a project that helps families find focus and direction while working in the garden. It also serves a safe space of mental health healing, wellness, cultural learning and recovery. The project has been a long-term center for many families and has impacted their importance of community service and social justice. Our poster presentation will focus on the accomplishments from the project's origin and achievements to-date as well as future goals and plans to outreach to other families that can utilize the "family healing gardens" in their own perspectives.

Navajo Technical University

Name: Cora Bahe

Title: Medicinal and Ceremonial Use of Sacred Datura (*Datura Wrightii*) among the Navajo and Hopi Tribes of Northeastern Arizona

Abstract: Datura, a plant from the Solanaceae family that was used as a traditional medicine throughout history. It is a toxic plant, it can also be used for good medicine or bad. The information gathered is to provide a quick synopsis of how the plant was utilized traditionally from a Navajo's perspective in certain ceremonies as well as for pain management. The alkaloids within the plant have been documented to help certain ailments in humans but remain toxic to animals. If the plant is ingested in high concentrations, it can cause hallucinations and most often death. The three main alkaloids the plant contains are atropine, scopolamine, and hyoscamine. The study of the plant over time shows that it was used both religiously in multiple tribes as well as medicinally. Evidence is provided in pottery pieces as well as pictographs throughout the southwest associated with different tribes.

Name: Arantxa Curley

Title: Understanding climate impacts on cone production and the need for comprehensive pinyon jay population monitoring in the Dinétah (Navajo Nation)

Abstract: *The pinyon pine (Pinus edulis) ecosystem on Dinétah (Navajo Nation) is facing growing pressures from climate change. We focus on highlighting how changing climate patterns drive annual cone yield, which affects the availability of food resources for the pinyon jay (Gymnorhinus cyanocephalus), a key seed-dispersing bird species. Cone scar records show decreases in production in dry years and immediately after a fire. We discuss the pressing need for more rigorous monitoring of pinyon jay populations as the current lack of data limits conservation and wildlife management planning. We summarize recent data collection efforts on Dinétah using the Great Basin Bird Observatory's community science program. Additionally, the Diné people have multiple cultural uses of these two interwoven species that can inform their changing distribution patterns across the landscape. By combining cultural and ecological knowledge, this research is essential for developing comprehensive management practices that honor Indigenous Knowledge while informing climate-resilient strategies.*

Northwest Indian College

Name: Jade Felliciano, Misty Peacock

Title: Analyzing the diurnal variability of longfin smelt in Bellingham, Bay, WA

Abstract: We used eDNA to study diel movements of Longfin Smelt (*Spirinchus thaleichthys*) in Bellingham Bay, WA. Surface and deep eDNA samples were simultaneously collected on July 29th 2025 (daytime) and July 30th 2025 (evening). The sample locations were spaced on a one nautical mile grid. During the daytime, Longfin Smelt DNA was detected in 33% of the deep samples, while no Longfin Smelt DNA was detected near the surface. In the evening, 33% of the surface samples tested positive for Longfin Smelt, while the species was detected in only 7% of the nighttime deep samples. The vertical shifts in Longfin Smelt distribution were not related to pH, water temperature, or to the biomass and composition of the phytoplankton community. Our study supports the hypothesis that diel migration is a life history strategy of Longfin Smelt in marine environments.

Oglala Lakota College

Name: Esperanza Dixon, Lena Goings

Title: From Prairie to Lab; Evaluating the Healing Potential of Prairie Sage (*Artemisia ludoviciana*)

Abstract: Prairie Sage or White Sage, known in Lakota as Peji Hota (*Artemisia ludoviciana*), is a sacred plant with deep cultural and medicinal importance. At the Pine Ridge Community Garden, prairie sage has been cultivated for the past three years, reaching its tallest growth this past season at 6 feet 3 inches. This exhibit highlights both traditional knowledge and modern scientific findings about this remarkable plant.

The project seeks to increase awareness of the cultural significance and medicinal potential of prairie sage. It aims to bridge Indigenous knowledge with ethnobotanical and pharmacological research, emphasizing its uses across Native communities and its relevance in modern contexts.

Prairie sage was grown, observed, and harvested at the community garden. Research was conducted on both traditional tribal uses and published scientific studies of *Artemisia ludoviciana*. These include its preparation as teas, salves, and smudges, as well as studies investigating its bioactive compounds.

Prairie sage has long been valued by Tribes such as the Dakota, Cheyenne, Crow, Kiowa, Apache, and Bannock for remedies addressing stomach issues, respiratory problems, skin conditions, and women's health. Today, it continues to be used in the community for medicine, smudging, and as a meaningful gift. Scientific research supports its antimicrobial, antioxidant, antibacterial, and antifungal properties, suggesting important connections between tradition and science.

This project will continue exploring the pharmacological potential of prairie sage, with particular attention to its antibacterial and antifungal properties. By advancing research and creating educational opportunities, this work can help safeguard traditional knowledge while opening pathways for culturally respectful applications in modern medicine.

Name: Megan Little Hawk, Lena Goings

Title: Mother Nature's Resilient Plant: *Yucca glauca*

Abstract: *Yucca glauca*, known as huphéstola in Lakota and commonly called soapweed, has long been integral to Native American cultures for its many uses. Traditionally, yucca provided food, fiber for weaving, and roots rich in saponins that were used for cleansing and healing. Beyond cultural applications, yucca has natural anti-inflammatory and antioxidant properties, and it is increasingly recognized for its potential in modern medicine and agriculture. Even indoors, yucca serves as a natural air purifier and stress reducer, making it both practical and symbolic as a plant of resilience.

The objective of this project is to highlight the cultural significance and scientific

potential of *Yucca glauca* through community-based learning. At the Pine Ridge College Center Community Garden, yucca is being cultivated as a teaching resource. Activities include hands-on workshops where students and community members engage in gardening, harvesting, and learning about yucca's nutritional, medicinal, and sustainable uses.

The impacts of this work are both local and broad. Locally, yucca cultivation promotes cultural preservation, food sovereignty, and sustainable product development, such as natural soaps and shampoos. It also strengthens community engagement by bringing together elders, students, and families to share knowledge. Broadly, yucca research supports exploration of bioactive compounds with applications in health, environmental sustainability, and agriculture.

Future plans include expanding garden-based learning, developing community-led soap-making and sustainable product initiatives, and exploring research partnerships to deepen scientific understanding of yucca's benefits. By combining cultural knowledge with scientific inquiry, *Yucca glauca* serves as both a link to the past and a pathway toward a healthier, more sustainable future for the Oglala Lakota Nation and beyond.

Name: Leon Red Kettle, Elisha Yellow Thunder

Title: Flooding Along the White River: Protecting Lakota Lands and Communities

Abstract: Flooding along the White River poses a significant challenge for communities on the Pine Ridge Reservation. In March 2019, a blizzard and bomb cyclone created snow dams and ice jams that caused widespread flooding, stranding residents, destroying infrastructure, and rendering over 500 homes uninhabitable. Entire villages faced humanitarian crises due to blocked access to aid and essential services (Dunbar, 2019; Elbein, 2019; Kozlowski, 2019). Flood-prone areas, particularly low-lying villages and tributaries such as Wounded Knee Creek and Porcupine Creek, remain vulnerable as climate-driven extreme events increase in frequency and severity.

The objectives of this project were to document past flood events, evaluate infrastructure vulnerabilities, and test the potential of localized mapping for preparedness and resilience. Using data from Earthaccess DEMs, OpenStreetMap, USGS, NOAA, and FEMA, students processed crest history records, topographic overlays, and flood polygons with Python, QGIS, and Leaflet.JS.

Key activities included creating interactive maps with clickable overlays (e.g., Porcupine, SD flood data from 2019), comparing discharge and rainfall patterns across years, and identifying high-risk infrastructure such as Highways 41 and 73. These activities demonstrated how localized, tribal-led mapping enhances data sovereignty, improves access to insurance and government aid, and provides actionable knowledge for decision-making.

The project's impacts highlight that flooding produces inconsistent and difficult-to-predict outcomes across the basin. Localized mapping narrows this gap, helping identify

vulnerable communities like Oglala, Porcupine, and Pine Ridge. Results also reveal that much of the existing flood infrastructure was built decades ago and is not adapted to present-day climate challenges.

Future work will focus on predictive modeling with fbprophet and scikit-learn, generation of 5–100 year flood maps, and correlating high-water events with nitrate and pollutant levels. This approach will support long-term monitoring and resilience planning that integrates modern data science tools with Lakota community priorities.

Saginaw Chippewa Tribal College

Name: Tamara Lawson

Title: Propagation: Can Wild Rice Grow Outside Its Natural Habitat

Abstract: Propagation: Can Wild Rice Grow Outside Its Natural Habitat

The migration story of the Anishabe (the Ojibwe, Odawa, Potawatomi, Mississauga, Nipissing, and Algonquin) was led by Seven Fires (prophecies) foretold by Seven Grandfathers (prophets). The third grandfather told that the chosen ground where the families are to move to will be where "the Food Grows on the Water". Manoomin is a sacred food, and the harvest is a cultural practice that has been passed from generation to generation. It is primarily found in the Great Lakes region. *Zizania palustris*, or Manoomin, is an aquatic grass that typically grows in shallow, calm, and clear waters with a mucky bottom.

The protein content of wild rice is much higher than that of other grains, while being gluten-free, which makes it a substantial food for humans and wildlife alike. Long before Wild Rice became the state grain of Michigan, it was a primary food system of the Anishinaabe, which included waawaashkeshi (deer), waabooz (rabbit), amik (beaver), mooz (moose) giigoonh (fish), min (berries), and manoomin (wild rice) for hundreds of years.

While conservation and restoration efforts for wild rice have been working for many Anishinaabe tribes, threats that still face Manoomin include changing water levels and increased storm intensity from climate change, invasive aquatic species, and human activities.

How can Manoomin be propagated outside its natural habitat while respecting traditional Anishinaabe knowledge?

Name: Tristan Green

Title: Mshkikiikaan (The Place of Medicine) Signage Project

Abstract: Modern Indigenous communities are working hard to reclaim their languages, cultural practices, and traditional knowledge that have been forcibly stripped away from them by colonialism.

At SCTC, we have been working to develop and integrate an interactive sign system that will include Anishinaabe, English, and Latin translations of the different plants and medicines we grow at our student garden Mshkikiikaan (The Place of Medicine).

The idea is to produce a sign with the image of the plant's image and its translation, along with a QR code that visitors can scan to access the website link. The link will contain recordings of the Anishinaabe translations of the plant/medicine names, how to grow them, their uses, recipes, additional information, attributes, and stories unique to each plant.

The goal of this project is to help visitors connect with the garden while simultaneously being provided an outlet to explore Anishinaabemowin, and traditional knowledge. The signage project is an effort to begin rebuilding and reclaiming what colonialism has attempted to silence, offering a healing resource that connects generations to the traditional ways of their ancestors.

Name: Brittany Wakley

Title: Comparing Traditional and Modern Gardening Practices.

Abstract: Soil is the foundation for cultivating a harmonious relationship with Aki (Earth). The Saginaw Chippewa Tribal College food sovereignty garden, Mshkikiikaan (The Place of Medicine), currently uses both modern and traditional practices in gardening. By utilizing both methods, Mshkikiikaan is a viable place to conduct research on the soil. Tyvek, or plastic mulch, is a commonly used material to suppress weeds. Cover cropping is a traditional form of weed suppression, where plants like clover and rye are grown to prevent weeds and replenish the soil. Companion planting, an Indigenous method consisting of plants that have a symbiotic relationship, pairs plants together to create a healthy soil environment. These three techniques were utilized to research differences between traditional and modern gardening practices. Through routine soil testing of controlled environments: uncovered, grey tyvek, black tyvek, and cover crop areas, data was gathered related to several variables. The negative and positive impacts on plant growth and soil health were determined through the collected data. Given these results, Mshkikiikaan and other farmers, including people from the tribal community, will benefit by bringing awareness to the importance of taking care of the ashkikii (soil).

Tohono O'odham Community College

Name: Rhiannon Franklin, DeAnndra Porter

Title: The Garden Club's Contribution to Indigenous Agricultural Practices at TOCC

Abstract: The garden club at Tohono O'odham Community College invites students and staff to learn about the local environment and Indigenous practices. Led by members from different Indigenous tribes, the club shares farming and gathering knowledge rooted in Traditional Ecological Knowledge, the O'odham Himdag, and To-Şo:son values. The club provides resources for students at a range of skill levels, from beginners to advanced gardeners, focusing on traditional agriculture practices. It includes instruction in identifying and cultivating crops like the Three Sisters (squash, beans, and corn), which are associated with soil nutrient management. The club also presents information about the nutritional value of these crops and their role in supporting health. The garden club facilitates experiential learning through hands-on workshops. Previous activities include soil testing, potting mix preparation, transplanting i'itoi siwol (wild onions) and young spider plants, as well as crafting Wa'o, a traditional harvesting tool constructed from cactus ribs. The club also coordinates participation in Ciolim and Bahidaj harvests in collaboration with the college community and neighboring districts. Additionally, student housing initiatives encourage the development of compost piles near dormitories to promote sustainability, acknowledging the conversion of natural waste into organic fertilizer.

Since its inception, the garden club's activities have grown, providing students with knowledge about sustainable agriculture. Upcoming projects include establishing an Oidag (traditional O'odham farm) at S-cuk Do'ag Maşmamckud (TOCC main campus) to make crops available to college students, reintroduce traditional crops to the O'odham food system, support pollinators, and improve the campus environment. By applying available resources and sharing agricultural practices throughout the Nation, the club intends to keep districts updated and involved with traditional agricultural practices, while supporting Oidag villages and access to culturally significant foods. Faculty approved by Adrian Quijada

Other Presenters: DeAnndra Porter dporter@tocc.edu

Turtle Mountain College

Name: Sadie S. Frederick

Title: Aamook Bimaadiziwin

Abstract: My involvement with the bee program began in November 2024, when I was hired to study bee life and help care for the hives we would receive in the spring. In May 2025, we received eight nucs of OHB Saskatraz Honey Bees, marking the start of an exciting journey in beekeeping and pollinator education.

My primary goal in this project is to care for the bees, support their health and growth, and learn about their way of life. Much of the initial setup and ordering of supplies was done before I joined, thanks to Mr. Mark Hamley, who helped lay the foundation for the program. Since then, I've been closely supported by my supervisor, Mrs. Michelle Azure, and we've worked side-by-side in managing the hives.

Everyone at Anishinaabe Campus has contributed to the bees in some way—whether by helping with hive checks, supporting logistics, or simply showing interest in their well-being. It's truly been a team effort.

Goals and Practices

Our main objective has been to help the bees thrive while learning how to best care for them.

Since their arrival, Michelle and I have been:

Feeding the bees to ensure they have enough food stores for winter.

Expanding the hives by adding boxes to prevent overcrowding and swarming.

Conducting weekly frame inspections to monitor the queen's health and the overall strength of each colony.

Challenges and Learning

We've faced a few challenges along the way—some swarming events and queen losses—but we tackled them through research and teamwork. By responding quickly, we were able to stabilize the affected hives and make them stronger.

Looking ahead, our focus is on helping the bees survive their first winter. We've chosen not to harvest any honey this year, allowing the bees to keep all their food stores to increase their chances of survival.

Vision for the Future

If our hives make it through the winter strong, we hope to:

Expand the number of hives on campus and in the community.

Harvest honey to share with our community members.

Create products from beeswax, such as candles or salves, in the future.

Most importantly, we want to build a community that values bees and understands their critical role in the ecosystem. By nurturing these hives, we hope to provide natural honey, support pollinator health, and create more pollinator-friendly environments across our land.

United Tribes Technical College

Name: Mary Gagnon

Status: Student

Title: Dietary Analysis of Silver-Haired Bats in North Dakota

Abstract: Silver-haired bats (*Lasionycteris noctivagans*) are among the most common bat species in North Dakota and play a crucial role in the ecosystem. Besides being key pollinators, bats are known for consuming a variety of insects including damaging crop pests. Despite their importance across the globe, very little is known about the populations in North Dakota, a state heavily reliant on agricultural production. This project aimed to examine the diet of silver-haired bats in North Dakota by utilizing molecular techniques to identify prey in guano pellets. By analyzing the prey remains in bat guano, this study contributes to the understanding of silver-haired bat foraging patterns, which may inform conservation strategies and agricultural management practices in the state. How we analyzed the guano is by breaking the samples down to extract the DNA of the prey eaten and cleaned the samples up. We used the zymo research quick-DNA fecal/soil microbe mini-prep kit, this kit was used to break the samples down and clean them. After that we used the ZBJ ART F1C and ZBJ ART R2C primers for PCR and gels for later sequencing.

Name: Courtney Mitchell

Title: Soil Nutrient Testing Along Oak Creek on the Standing Rock Reservation for Dam Removal

Abstract: A low water dam along Oak Creek on the Standing Rock Reservation is being considered for removal. To support management decisions, SRST Water Resources and UTTC designed ecological studies to determine the dam's impact. We used a Smithsonian sampling protocol at three sites: (1) the dam, (2) 5 miles above the dam, and (3) 2 miles below the dam. Samples were taken every 10 m along a 50 meter transect perpendicular to the creek with a soil corer to a depth of 10 centimeters. The samples were air dried for 13 days, then taken to the ARS NGPRL and dried at 105°C for 42 hours. Each sample was ground to fit through a 2 millimeter sieve. Samples were sent to the Penn State lab to be tested for soluble salts, total nitrogen combustion, total carbon combustion, and total sorbed metals. These tests will provide data on nutrient levels to better understand if there are pollutants. Future projects may include retesting if the dam is removed.

Faculty Oral and Poster

College of the Muscogee Nation

Name: Courtney Natseway

Title: Yaupon Holly in Mvskoke Nation

Location: Paloma I-III

Abstract: Yaupon Holly is a native evergreen shrub found in the southeastern United States. For the Mvskoke Nation, Yaupon holds significant ceremonial, medicinal, and social value. It is the only native North American plant that naturally contains caffeine. One of CMN Extension's many goals is to educate + reintroduce Mvskoke citizens to Yaupon Holly.

Aaniiih Nakoda College

Name: Dan Kinsey, James Swierc, Sonny Gray, Katelyne Goes Ahead, and Truan Yellowstone

Title: Ongoing Water Research and Education Occurring on Fort Belknap Indian Reservation, North-Central Montana

Location: Hacienda I-III

Abstract: In 2018, Aaniiih Nakoda College (ANC) was awarded a grant from the National Science Foundation Tribal Colleges and Universities Program (TCUP) to establish a Tribal Enterprise Advancement (TEA) Center – the Aaniiih Nakoda Nic? Mni (Water) Center. The overall goals of the project include conducting education and research on water related issues on the Fort Belknap Indian Reservation. Research projects include assessing ground water and streams impacted by mining in the Little Rocky Mountains and the middle Milk River. Research on the streams and groundwater impacted by previous mining in the Little Rocky Mountains consists of water chemistry, stream flow measurements, groundwater level monitoring and bio-assessments using benthic macroinvertebrates and diatoms as indicators of stream health. Research on the Middle Milk River consists of water chemistry and bio-assessments using benthic macroinvertebrates and diatoms. Educational presentations to the community have included topics such as the status of the Fort Belknap Water Settlement, Drought Mitigation, Aquatic Invasive Species, Flood Mitigation, Climate Change Adaptation, and updates on the repair of the St. Mary's Diversion Project.

Groundwater monitoring consists of collecting water samples from monitoring wells that were installed by the USGS during 1987-1988 in alluvial aquifers flowing out of the Little Rocky Mountains. Water level data is collected by with a combination of data loggers and hand measurements. Water samples are collected from the monitoring wells and analyzed for major ions, nutrients, and trace metals. Water samples macroinvertebrates and diatoms are collected from streams that have been impacted by mining and from a reference stream that has not been impacted by mining. Also, water samples, benthic macroinvertebrates and diatoms are collected from the Middle Milk River.

Oregon State University

Name: Dr. Quincy Clark, Jennifer Freeman, Olivia Perez

Title: Integrating Indigenous Epistemology and Knowledge (IEK) Systems into a STEM-Focused Introduction to Hemp Course: Successes and Challenges

Location: Hacienda I-III

Abstract: Purpose: This presentation examines the successes and challenges of weaving Indigenous Epistemology and Knowledge (IEK) systems into a STEM-focused Introduction to Hemp course. The goal was to design a culturally relevant and sustainable educational model that strengthens tribal sovereignty, supports workforce development, and advances tribally led participation in the emerging hemp bioeconomy.

Methods: The course was developed at a Native American-serving two-year college and framed through a Two-Eyed Seeing approach that values both Indigenous and Western scientific perspectives. Curriculum elements included land-based learning, lectures on hemp science and technology, hands-on activities with hempcrete, and community asset mapping. Data were drawn from classroom observations, student reflections, and discussions to identify both successes in IEK integration and challenges that require refinement.

Findings: Key successes included the use of land-based and experiential learning, which students reported as affirming their cultural identity and strengthening their understanding of sustainability and reciprocity. Challenges emerged in balancing technical STEM content with Indigenous worldviews, aligning institutional requirements with community priorities, and securing sufficient time and resources for culturally grounded activities. These dynamics provide important lessons for refining future course models.

Implications: By openly examining both the successes and challenges of this first implementation, this work contributes to broader efforts to decolonize STEM education. The findings provide practical guidance for educators seeking to integrate IEK systems into STEM courses in ways that are culturally responsive, economically relevant, and tribally led.

Keywords: Indigenous epistemology, Traditional Ecological Knowledge, STEM education, hemp bioeconomy, Two-Eyed Seeing, tribal sovereignty

The USDA NIFA AFRI Sustainable Agricultural Systems grant funds this project.

Faculty Oral Only

Chief Dull Knife College

Name: Henry Thompson, Katherine Hartmann, University of Minnesota, Crookston

Title: The Development of a Community Needs Assessment for Tribal College

Extension: The Collaboration, the Process, and the Tool

Location: Palmoma I-III

Abstract: To assess and improve their nonformal educational programming, Extension staff at Chief Dull Knife College in Lake Deer, Montana, planned to conduct a community needs assessment. During their grant development process, they included this assessment as an objective to inform their programming and practice, and to make sure that they are continuing to meet the needs of their community members. As part of that process, they reached out to an Extension Specialist at the University of Minnesota to help them plan the assessment, analyze the data, and report the findings. This research presentation will describe the reasons for developing a community needs assessment in general, the process that this team went through to develop this particular needs assessment, and the needs assessment tool itself. Additionally, the dimension and history of the collaboration between the Chief Dull Knife College Extension educators at a 1994 Land Grant Institution and the University of Minnesota professor at an 1862 Land Grant Institution will be discussed. This project aims to improve the Extension programming for the Northern Cheyenne community, provide an example of a needs assessment tool for other Extension professionals to use, and to offer an example of a successful collaboration between educators across the Land Grant System.

Fond du Lac Tribal and Community College

Name: Kelsey Myhre

Title: Food as Medicine: Strengthening Tribal Communities through Collaborative Partnerships in Local Food Systems, Healthcare, and Tribal College Extension

Location: Hacienda I-III

Abstract: In 2023, Fond du Lac Tribal and Community College, in partnership with Fond du Lac Human Services Division, developed the Veggie Rx Program to serve a diverse set of community needs outlined in the Fond du Lac Food Sovereignty Initiative. Since its launch, the program has focused on improving health outcomes of patients who are high-risk or currently experiencing diet-related chronic illness through tailored nutrition education and improved access to fresh, locally grown or harvested, culturally relevant foods. Additionally, the program has aimed to create stable and accessible markets for local food producers, connect Tribal College students to experiential learning opportunities related to practical solutions for complex issues directly affecting their communities, and develop new and robust collaborative partnerships to support future innovation and systems change.

Over the past three years of the Veggie Rx Program's implementation, more than forty families have participated, with thousands of pounds of locally sourced food distributed to participants in the Mino Aya Win Clinic's Diabetes Prevention Program and the Women, Infants, and Children (WIC) Program. The program's food purchases have supported sixteen small, local food businesses—80% of which are Native-owned. In addition, twenty-six Fond du Lac Tribal and Community College students have played a vital role in developing and maintaining campus growing spaces, harvesting, washing, and packing produce, and assisting with food box distributions. Numerous collaborative partnerships have emerged from the program, resulting in the further advancement of shared goals related to Food Sovereignty and community health. As the program moves into its fourth year, we hope to deploy creative solutions to continue serving the Fond du Lac community.

Name: Steve Gebhard

Title: Increasing Community Research and Building a Research Pathway at Fond du Lac Tribal and Community College

Location: Hacienda I-III

Abstract: Traditional STEM-related internships often take the form of 10-week intensive summer opportunities that are difficult for many students to commit to. These opportunities can be narrow in focus and tend to be most appropriate for students about to graduate, leaving fewer opportunities for students just starting college or searching for their particular interests. The Fond du Lac Tribal and Community College (FDLTCC) Research Experiences for Undergraduates program was developed to reach as many students as possible to offer co-curricular research opportunities that varied in length, agency, and distance requirements. In this model, first year students are introduced to a diverse range of projects they are involved with. Further into the program, they take on leadership roles with a particular project of interest and ideally are matched with an external internship as they graduate and move on to their next academic or career pursuits. Through partnering with local experts from the local tribal, state, county, and federal agencies, we have been able to offer students high quality co-curricular experiences in a wide variety of fields including wildlife biology, invasive species monitoring, forestry, soils science, and climate change. Some of these partnerships have grown beyond expectation and are also influencing the STEM curriculum at FDLTCC.

Nueta Hidatsa Sahnish College

Name: Lori Nelson

Title: Trauma-Focused Equine Assisted Learning

Location: Paloma I-III

Abstract: Nueta Hidatsa Sahnish College (NHSC), a 1994 Land Grant tribal college located on the Fort Berthold Reservation in New Town, North Dakota, is advancing innovative, culturally grounded approaches to healing and education through Trauma-Focused Equine Assisted Learning (TF-EAL). Supported by a USDA Tribal Colleges Research Grant, the program integrates traditional horse culture with trauma-informed practices to address health disparities disproportionately impacting Native communities. The objectives of TF-EAL are to (1) operationalize connection and relationship as measurable outcomes in equine-assisted learning, (2) strengthen culturally affirming approaches to trauma recovery, and (3) expand evidence-based, community-defined practices for equine-assisted programs. Activities include structured equine learning sessions with at-risk youth, recovery center participants, and school partners; training and mentoring of community organizations across the MHA Nation, Turtle Mountain, and Blackfeet Nation; and collaborative evaluation efforts to document outcomes and refine curricula.

Early impacts demonstrate that participants experience increased self-awareness, emotional regulation, and cultural reconnection through the human-horse relationship. Feedback reveals that horses provide a unique, nonjudgmental partner in processing trauma and building resilience. Community partnerships—ranging from youth programs to recovery centers—further strengthen the reach and sustainability of TF-EAL.

Looking ahead, NHSC seeks to expand its equine program through deeper integration of traditional ecological knowledge, broader community training initiatives, and continued collaboration with public health researchers to build a strong evidence base. By centering relationships and cultural strengths, TF-EAL not only contributes to trauma recovery but also supports USDA's strategic goals of fostering community well-being, resilience, and innovation within Tribal Nations.

Oglala Lakota College

Name: Alessandra Higa

Title: Oglala Lakota College Summer Bridge Program: (Re)Connection with Unci Maka (Mother Earth)

Location: Mohave I-Kiva III

Abstract: Tribal Colleges and Universities (TCUs) play a vital role in South Dakota, home to nine federally recognized tribes. Oglala Lakota College (OLC), serving the Rapid City community, Pine Ridge, and Cheyenne River reservations, offers culturally relevant, and tribally aligned education. To support Native American and other minorities students in the transition from high school to college, OLC developed a summer bridge program focused on strengthening STEM identity, academic readiness, and community

engagement. The program uses a place-based research model guided by wółakholkičiyapi—learning Lakota ways of life for the benefit of the community—and promotes collaborative problem-solving through “teaming.” Inspired by Ma and Nickerson’s (2006) four-dimensional learning model, the curriculum integrates design, social, conceptual, and professional skills development. The three-week intensive summer program centers on hands-on STEM activities framed by a seven-direction Lakota perspective: West (water), North (animals), East (fire), South (plants), Earth (land/soils), Sky (air), and Self (identity and interconnection). Students engaged in ecological research on grassland ecosystems, integrating Lakota perspectives, traditional knowledge, and scientific methods. Under the mentorship of former students, community members, and faculty, students collected and analyzed data, culminating in poster presentations shared with their thiyóšpaye (extended family). This presentation will highlight program outcomes, student impacts, and best practices for culturally responsive STEM education. Reflections on lessons learned and future directions—including expanded community partnerships and longitudinal student tracking—will also be discussed.

This work is funded by NSF E-CORE, NSF TCUP, NIH-INBRE, USDA NIFA.

Name: Foster Sawyer

Title: Data Squared, Resiliency Cubed: Empowering Local Solutions

Location: Mohave I-Kiva III

Abstract: This Tribal Research Grants Program project is a three-year, collaborative effort between Oglala Lakota College (OLC), the Environmental Data Science Innovation & Impact Lab (ESIIL), and Daeaar Inc. Objectives for the project include providing groundbreaking technology for accessing and processing large datasets for hydrological and agricultural modeling across the Oceti Sakowin region, and to identify appropriate datasets and compile necessary metadata to assemble a functioning Integrated Data Cube for use by students and faculty at OLC.

Activities for the project have included acquiring approval and feedback from the OLC Institutional Review Board (IRB) and the Oglala Sioux Tribe Reservation Review Board (RRB), with plans to obtain additional feedback from the OLC Elders Council. Institutional approval was obtained to set up an OLC GitHub site, and appropriate hydrological and environmental datasets, along with the necessary metadata, have been identified and compiled when necessary. A case study using the newly constructed Data Cube with geologic spatial data for the Pine Ridge Reservation is currently underway. Another significant activity within this project includes an effort to assemble a framework and procedures that properly implement data sovereignty when managing and accessing digital data.

It is envisioned that the OLC Data Cube will be used for many geospatial and environmental purposes in the future. With appropriate security measures and management protocols for data sovereignty, this technology can be extended to other fields including historical repositories and other culturally sensitive datasets.

This work is funded by USDA NIFA TCRGP and NSF TCUP.

Name: Nick Klein

Title: The Lakota Omics Lab

Location: Mohave I-Kiva III

Abstract: Oglala Lakota College serves a large geographic area with research laboratories located at the central Piya Wiconi campus. These facilities were in disuse following the COVID pandemic and had little working equipment to support student and faculty research projects. Local access to research instrumentation is critical both for hands-on student learning and to protect Indigenous data sovereignty by performing culturally sensitive work and storing resulting data on-site. Leveraging funding from NSF E-RISE, NSF TCUP, USDA NIFA, NIH-INBRE, and AICF VanVlack, we have equipped a Lakota Omics Laboratory with a comprehensive suite of molecular and microbiology instrumentation. We present an overview of recent and future research and outreach activities utilizing the LOL facilities. Ongoing NSF-funded research focuses on nitrogen-fixing plants bacteria from the native prairie environment and their potential application in renewable fuel and food production. Near-future projects will utilize DNA barcoding methods as non-invasive tools for studying wildlife ecology. Over the previous academic year, we have hosted eight days of intensive workshop activities to train undergraduate students and local K-12 teachers in environmental microbiology methods. This coming year, we are planning two intensive workshops on water quality and then on plants.

Red Lake Tribal Nation

Name: Wendy Greenberg

Title: Can Winter Cover Crops Be Used to Improve Vegetable Production in Northern Minnesota?

Location: Hacienda I-III

Abstract: Cover crops can be very beneficial to soils and vegetable production by adding nutrients, particularly nitrogen, improving soil structure and water retention, and reducing weeds. However, the short growing season in northern Minnesota presents challenges to fit in cover crop and vegetable growth in the same season. The purpose of this study was to determine if winter planted cover crops are beneficial to bell pepper production in Red Lake, MN. We established a 4-by-4 randomized block experiment with two cover crop treatments, rye-daikon-vetch mix and Austrian pea, and two control treatments, weedy control and bare control. Cover crops were planted the previous fall and terminated in early June for bell pepper planting. In addition, each plot was split, with half the pepper plants receiving blood meal side dressing to assess possible interaction between additional nitrogen and cover crop treatments. Preliminary results indicate that soil NO₃-N was actually highest for with the weedy control, possibly due to the presence of some local clover and vetch in the weeds. Bell pepper yields so far have been the highest with the rye-daikon-vetch mix with blood meal. Ultimately, it might be more effective to

alternate years with cover crops and bell peppers to maximize benefits of cover crops and bell pepper yields in this region with a very short growing season.

Salish Kootenai College

Name: Ian Issaia McRyhew

Title: PurpleAir Monitoring on the Flathead Reservation: Community Education & Data for Air Resilience (CEDAR)

Location: Mohave I-Kiva III

Abstract: Under the Mission Mountains in northwest Montana, wildfire smoke has become part of our seasonal cycle on the Flathead Reservation, and we have a responsibility to protect our people, especially children and elders. Salish Kootenai College Extension partnered with schools and Tribal buildings to build an indoor-air program distributed and built from the community-up. Together with the Confederated Salish and Kootenai Tribes, university, private, and government partners, 41 PurpleAir sensors have been installed and maintained, providing Community Education & Data for Air Resilience (CEDAR). SKCE served as scientist and relative, providing technical setup plus the trust-building that moved data into classrooms, hallway displays, front offices, websites, and reader boards. Teachers and students are the true leaders. Using PurpleAir graphs and AQI readings, teachers and students turned data into action: flag alerts at entrances, reader-board updates, and simple “if AQI is high, then action” steps to limit outdoor exposure on smoke days. With facilities teams, we are pairing indoor/outdoor sensors to assess feasibility of using MERV-15 HVAC filters, HEPA units, and DIY box-fan filters. Administrators and clerks are learning to use the dashboard, set alerts, and post data to school websites, and these are small, durable practices that normalize making air-quality decisions based on real-time PM2.5 data. This presentation will highlight what worked, and what didn't, while building the CSKT (CEDAR) network, including placement of monitors, planning for WiFi drops, and assuring consistent stewardship of the sensors themselves. Our school partnerships coordinator is helping to build a teacher–facilities network, and district ownership, that will keep the system running after the grant ends. For other Tribal communities, this is a practical, replicable path: teachers and students at the center, and facilities as partners. The result is not just more sensors, but local knowledge systems where clean indoor air is part of everyday safety.

Texas Tech University

Name: Angela Walla

Title: Pathways to Federal Grant Success: Writing with Purpose, Planning with Precision

Location: Hacienda I-III

Abstract: Obtaining federal grant funding has become increasingly competitive, with approval rates ranging from as low as 3% to 30%, depending on the agency. As a result, developing a clear, compelling research plan that aligns with a funding agency's priorities is critical to proposal success. This workshop is designed to equip participants with practical strategies and resources to strengthen their grant writing efforts. Learning objectives include: 1) Identify key research priorities for this new administration; 2) Key Requirements for Grants; 3) Use of visuals to caught the reviewer's attention and clearly articulating the project's purpose, value, and alignment with the funder; and 4) Illustrate the development of a research plan. The session will provide a detailed guide based on lessons learned and successful practices in grant writing. Participants will review sample Requests for Proposals (RFPs) and explore various approaches to visually and narratively align their research plans with funder expectations.

In addition, attendees will have the opportunity to sign up for free one-on-one technical assistance with experienced grant writers and support staff. This workshop is part of the USDA Food Safety Outreach Program (USDA FSOP) Technical Assistance Grant titled "Empowering Minority Serving Institutions Food Safety Specialists to Write Successful Food Safety Outreach Program Grants through Education, Training, and Technical Assistance." The grant was awarded to Texas Tech University, Alabama A&M University, and Louisiana State University. To learn more about the project and access free resources—including 20 recorded webinars, curated grant writing tools, and options for individual or group technical assistance—please visit the project website: <https://www.depts.ttu.edu/research/usda-grant-writing/>

Tohono O'odham Community College

Name: Adrian Quijada

Title: Micro-Certificate Programs at Tohono O'odham Community College's Land Grant Office of Sustainability Support Indigenous Workforce Development.

Location: Mohave I-Kiva III

Abstract: This presentation discusses the development of Micro-Certificate Programs (MCPs) at Tohono O'odham Community College (TOCC), which are intended to provide Indigenous youth and community members with specialized skills and practical training for employment and entrepreneurship. Based on the cultural values and traditions of the Tohono O'odham Nation, MCPs offer tuition-free academic and field-based opportunities in areas such as natural resource management, agribusiness, and horse care. Additional programs in clean energy, drone technology, and artificial intelligence literacy are being developed. The MCP model aims to address challenges that Indigenous communities encounter in accessing career pathways, particularly in remote areas where travel and extended absences from home may be difficult.

TOCC's approach integrates culturally relevant curricula with experiential training provided by community elders, professionals, and agency partners. Programs are designed to align with community needs, support economic independence, and facilitate the preservation of traditional ecological knowledge alongside contemporary practices. Objectives include expanding professional and entrepreneurial opportunities, enhancing workforce preparedness, and building local capacity through collaboration with tribal departments, universities, and NGOs. The MCP framework is a flexible educational strategy designed for Tribal Colleges and Universities (TCUs) to support Indigenous workforce development. It combines academic coursework with "Himdag," or Native cultural teachings, and integrates modern methods and technologies to provide practical skills while maintaining cultural relevance.

The MCP initiative brings together community elders, industry experts, and agency partners to enhance education. Students engage in collaborative projects and hands-on learning, applying technology and theory in practical settings that respect both traditional ecological knowledge and modern practices. MCPs offer more than professional training; they strengthen Native nations' resilience and self-sufficiency by building local capacity and expanding opportunities. These programs help preserve Indigenous knowledge and advance cultural heritage, making a lasting impact on tribal communities' prosperity.

Faculty Poster Only

Name: KateLyne Goes Ahead Pretty

TCU: Aaniiih Nakoda College

Title: Choreographing Change in Agroecology: An NLGCA – Tribal College Network

Abstract This multi-institutional collaboration among University of Wisconsin-Platteville (UW-P), Aaniiih Nakoda College (ANC), and Massey University (MU) advances agroecology research while preparing a workforce familiar with diverse agro-ecological systems. The project emphasizes soil health and water quality, with students gaining hands-on research and mentoring experience through cross-institutional and multicultural team science. Each institution serves distinct populations; UW-P's predominantly White students, ANC's American Indian and Alaska Native students, and MU's Māori and Pacific Island students-ensuring broad cultural perspectives in agricultural research and practice.

Research activities are tailored to local objectives but designed to enable long-term comparative studies. Collaboration with Native farmers and resource managers ensures cultural application and relevance to community-driven agricultural practices. In addition, data generated through this research initiative will be stored and accessible through a common data platform developed in partnership with the USDA Agricultural Research Service which will integrate soil, water, and climate data across sites.

Our poster presentation will expand on project goals and objectives, describe partner institutions, and highlight results from our year one data collection efforts at UW-Platteville Pioneer Farm and Fort Belknap Reservation. Data collection in year one included measures of soil health (soil infiltration tests, bulk density sampling, penetrometer readings, earthworm counts, crust soil sampling, and nutrient tests) and water quality (ammonium, chloride, nitrate, soluble reactive phosphorus, suspended sediment, total dissolved solids, total Kjeldahl nitrogen, and total phosphorus) in perennial streams at both locations.

Preliminary results highlight differences in infiltration rates, soil structure, and biological activity, underscoring the role of local management and environmental conditions. Future data collection will produce a complete dataset across collaborating institutions. This data set will then be available for evaluating local research project, cross-site comparative research, as well as educational instruction.

Fort Peck Community College

Name: Karen Fleener, John McClammy

Title: Innovating Gardening on Asphalt

Abstract: Due to construction on the current garden spot, the Ag. Dept. needed an alternative spot for the upcoming garden year. There weren't a lot of options, so we decided on utilizing the parking lot near the greenhouse. At first, we thought of using garden beds but changed it to garden soxx that we placed on wooden pallets. We named our new garden "The Asphalt Garden" since it was growing on top of the asphalt parking lot.

Montana State University

Name: Christa Merzdorf

Title: Collaborating with Tribal Colleges to develop targeted workshops

Abstract: The Trails to Research Program aims to increase research capacity at Tribal Colleges and to help students transfer from Tribal Colleges to 4-year universities. We have built strong relationships with all seven Tribal Colleges (TCs) in Montana and with TCs beyond Montana. In phase one of our program, we developed intensive one-week long courses based on zebrafish development, which we have recently opened to TC students beyond Montana. In phase two, we are helping TC faculty develop their own research-based courses according to their interests. This is ongoing at Aaniiih Nakoda College, and we are beginning to work with faculty at other Tribal Colleges. Phase three of our program is to develop and teach workshops that are more targeted and technique-focused, according to the wishes of the collaborating TC. We have taught immunofluorescence workshops at Salish Kootenai College and at Blackfeet College. We stained the zebrafish embryos generated in the week-long course with antibodies to visualize the state of their nervous systems. Thus, the courses had a direct connection to each other and we covered the importance of antibodies in research and medical diagnostics. At Chief Dull Knife College, we teach an RT-PCR workshop. We screen honey bees from the hives on the CDKC college campus for picornaviruses, which bees frequently carry (and are thought to be involved in colony collapse syndrome). We discuss how RT-PCR works and students learn about a variety of viruses. We are open to begin collaboration with other Tribal Colleges on additional projects. This work is funded by the NSF and USDA.

Oglala Lakota College

Name: Dana Gehring, Camille Griffith

Title: Where the Buffalo Once Roamed: Treaty Lands and the Oceti Sakowin Story

Abstract: The Oceti Sakowin (Seven Council Fires) and the pte oyate (buffalo nation) have walked together since time immemorial, sharing land, culture, and survival. Since European contact, treaties and land seizures have restricted both the people and the buffalo to smaller and fragmented spaces, disrupting cultural lifeways and ecological relationships. This project retells the displacement narrative of the Oceti Sakowin through spatial and historical analysis of treaty boundaries, hunting rights, and bison range. Our objectives are threefold: (1) reconstruct treaty boundaries using original 1851 and 1868 Fort Laramie Treaty texts and geospatial tools; (2) examine how restricted land access altered hunting rights, traditional food sources, and cultural continuity; and (3) compare historical bison ranges to modern fragmented herds to assess cultural and ecological impacts. Activities included digitizing treaty areas, reprojecting maps, calculating land loss, and overlaying historical ranges with present-day reservation boundaries.

Findings show that from an original homeland of nearly 700 million acres, tribes today control only 2,200 acres to 2.8 million acres, often further diminished by private land ownership. No free-roaming bison herds remain, and practices surrounding the tatanka—ceremonial songs, harvest rituals, and food sovereignty—are endangered. The loss of land and buffalo has resulted in profound cultural, ecological, and spiritual impacts on the Oceti Sakowin.

Future work will animate land and bison range loss over time, map current tribal herds in South Dakota, and analyze correlations between ecological displacement and cultural survival. By centering the Oceti Sakowin perspective, this research contributes to Indigenous-led efforts in land reclamation, cultural revitalization, and environmental stewardship, affirming the United Nations Declaration on the Rights of Indigenous Peoples.

This work is supported by the National Science Foundation (NSF DBI-2153040, ESIIL), USDA NIFA TCEG, and SD EPSCoR.